CONTROL DATA

60469540-H

930	Computer
932	Computer
9639	Tape Subsystem
9730	Tape/Disk Subsystem
9836	Disk Subsystem
19002	Console

MAINTENANCE Guide

CYBER 930 Computer System

Manual History

Revision Level	Description	ECO/FCO	Date
F	Manual revised to document console software Level 8224 and make miscellaneous technical changes.	PD03889	April 1988
G	Obsoletes all previous editions. Manual revised to document console software Level 8408C for CIP L703 release and make miscellaneous technical changes to support CYBER 932.	PD03946 PD03969 PD04036 PD04059 PD04067 PD04092	June 1988
H	Manual revised to document CIP 930 and 932 V10 L716 release and to support the 5698 CYBER Magnetic Tape Subsystem. This revision packet also includes enhancements to the power troubleshooting procedures.	PD04109 PD04169	November 1988

Control Data
1855 Minnesota Court
MISSISSAUGA, Ontario
CANADA
L5N 1K7

About This Manual

This manual is for personnel who have training in the maintenance of the CYBER 930 Computer System that contains either a 930 or 932 mainframe. The manual provides maintenance procedures for the system that includes the mainframe and peripheral cabinets. This book refers to Control Data publications that give maintenance procedures for the system console, communication network, printer, and subsystems within the peripheral cabinets, such as the streaming tape unit and fixed storage drive.

The manual contains five sections

1 Introduction to the System and the Repair Process

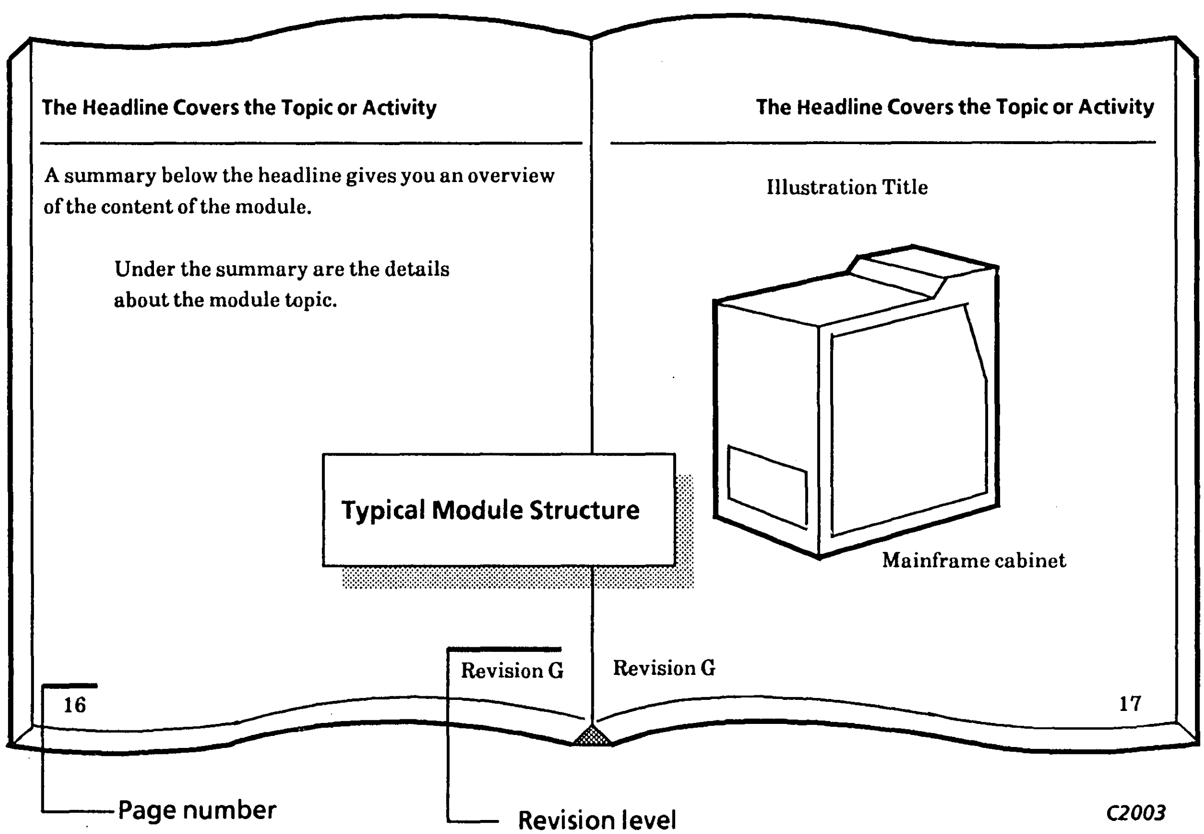
2 Trouble Analysis and Fault Isolation - Troubleshooting

3 Assembly Replacement and Repair Verification

4 Field Reporting and Parts Handling

5 Maintenance Aids and Utilities

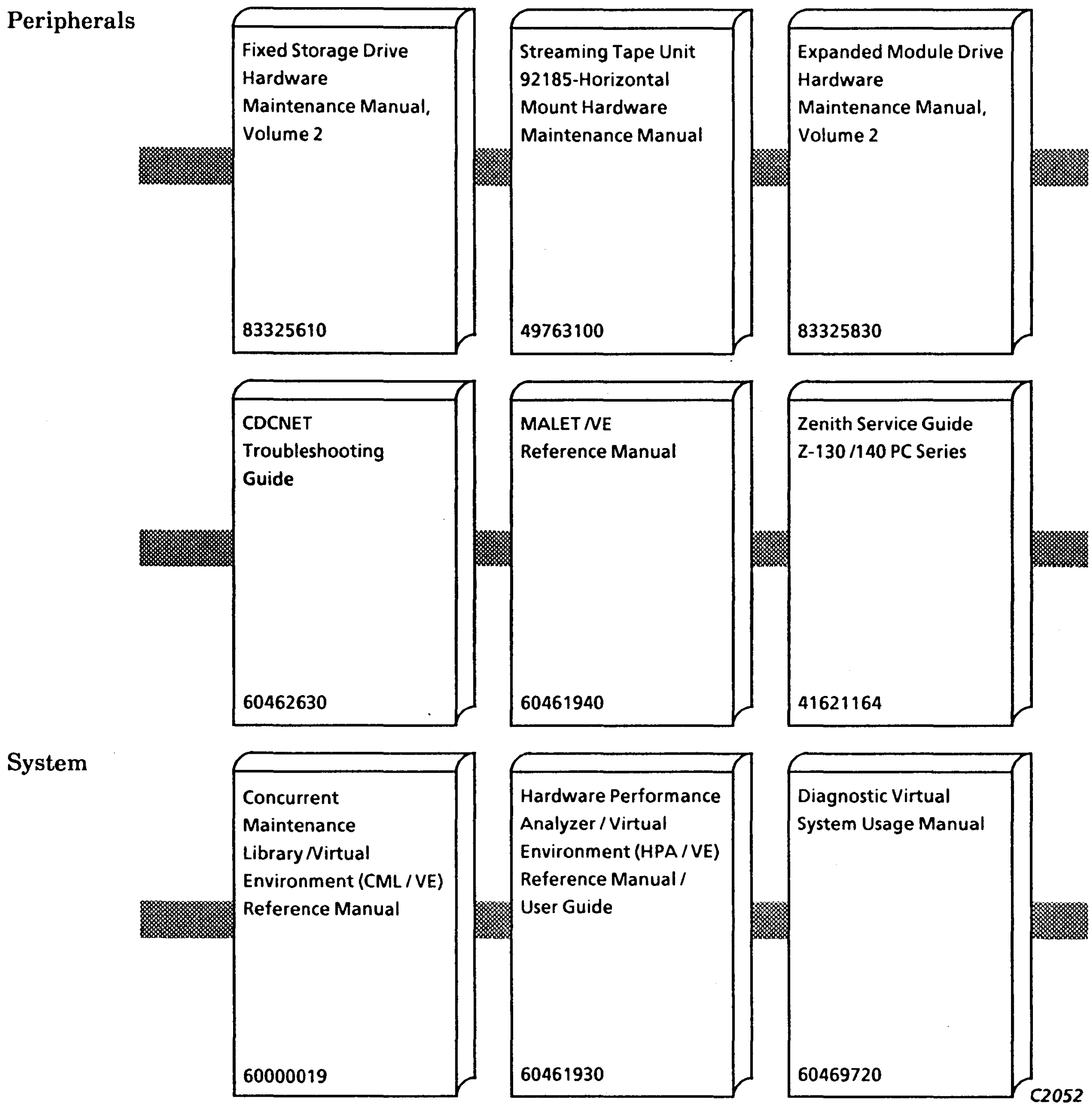
A two-page unit called a *module* addresses each activity or topic. In procedural sections, the modules are in order of execution.



C2003

Related Publications

Other Control Data publications that you can use to maintain the CYBER 930 Computer System are as follows:



C2052

Ordering Manuals

For more information about Control Data publications and how to order them, consult your Control Data representative, refer to the Literature Catalogue [Control Data publication 90310500], or contact Control Data Literature and Distribution Services, 308 North Dale Street, St. Paul, Minnesota, U.S.A. 55103.

Revision Changes

New features, as well as changes, deletions, and additions to information in this manual, are indicated by vertical bars in the unbound margins.

Submitting Comments

The last page of this manual is a comment sheet. Please use it to give us your opinion of the manual's usability, to suggest improvements, and to report technical or typographical errors. If the comment sheet has already been used, you can mail your comments to:

<u>Attention: Publications</u>

Control Data
1855 Minnesota Court
MISSISSAUGA, Ontario
CANADA
L5N 1K7

Product to Equipment Cross-Reference

Product	Equipment - Option	Description
930		Computer
	AA177A or B	Central system
	AT504A	Tape adapter drop cable set
	AT506A	CPU option, 930-31
	AT507A	CPU option, 930-11
	GK429A or B	Power option, 60 or 50 Hz
2629 - 1	GK428A	Integrated communications adapter
2629 - 2	GK431A	Integrated communications adapter
7221 - 11	FA168A	Magnetic tape adapter
19101 - 16	BS225A	Memory increment, 8 - 16 megabytes
19101 - 32	BS229A or B	Memory increment, 16 - 32 megabytes
19101 - 64	BS229A or B	Memory increment, 32 - 64 megabytes
19101 - 128	BS234A	Memory increment, 64 - 128 megabytes
19102 - 1	AT520A, AT521A	ICI-to-IPI adapter
19102 - 2	AT517A, AT518A	Low-speed channel converter
19103 - 1	AT489A or B	Input/output cluster, 930
19104 - 1	GK425A or B	Battery backup, 60 or 50 Hz
19107 - 1	AT506A	Processor upgrade (930-11 to 930-31)
19107 - 2	AD125A, AT506B, and AT524A	Processor upgrade (930-31 to single-input/output-cluster 932-32)
19107 - 3	AD125B, AT524A, and AT526A	Processor upgrade (930-31 to dual-input/output clusters 932-32)
65639 - 1	AT519A	ISMT adapter cable

Product	Equipment - Option	Description
932		Computer
	AA180A	Central system
	AT504A	Tape adapter cable
	AT506B	CPU option, 932-31 or 932-32
	AT507B	CPU option, 932-11
	AT524A	932 Dual CPU option
	AT527B	CPU option, 932-A
	AT528B	CPU option, 932-B
2629 - 1	GK428A	Integrated communications adapter
2629 - 2	GK431A	Integrated communications adapter
7221 - 11	FA168A	Magnetic tape adapter
19101 - 16	BS225A	Memory increment, 8 - 16 megabytes
19101 - 32	BS229B	Memory increment, 16 - 32 megabytes
19101 - 64	BS229B	Memory increment, 32 - 64 megabytes
19101 - 128	BS234A	Memory increment, 64 - 128 megabytes
19102 - 1	AT520A, AT521A	ICI-to-IPI converter 0; converter 1 and 2
19102 - 2	AT517A, AT518A	Low-speed channel converter
19103 - 2	AT526A	Input/output cluster, 932
19104 - 1	GK425A or B	Battery backup, 60 or 50 Hz
	GK429A or B	Power option, 60 or 50 Hz
19107 - 21	AT506B	Processor upgrade (932-11 to 932-31)
19107 - 22	AT524A	Processor upgrade (932-31 to 932-32)
19107 - AB2	AT528B	Processor upgrade (932-A to 932-B)
19107 - B12	AT506B	Processor upgrade (932-B to 932-11)
19112 - 64	BS234A	Memory option, 64 megabytes
19112 - 128	BS234A	Memory option, 128 megabytes
65639 - 1	AT519A	ISMT adapter cable

Product to Equipment Cross-Reference

Product	Equipment - Option	Description
10482 - 2		Control switch for dual magnetic tape controllers.
5698 - 10	311VC - 0HI 308 VC - 0HI	Magnetic tape subsystem includes one tape controller and two tape units. A 60-Hz, 208/230 V (1 × 2) tape subsystem.
5698 - 11	311WC - 0HI 308 WC - 0HI	Magnetic tape subsystem includes one tape controller and two tape units. A 50-Hz, 380/415 V (1 × 2) tape subsystem.
5698 - 12	311WC - 0HI 308 WC - 0HI	Magnetic tape subsystem includes one tape controller and two tape units. A 50-Hz, 220/240 V (1 × 2) tape subsystem.
698 - 30	308 VC - 0HI	Add-on magnetic tape unit, 60 Hz
698 - 31	308 WC - 0HI	Add-on magnetic tape unit, 50 Hz

Product to Equipment Cross-Reference

Product	Equipment - Option	Description
9639 - 1		Tape subsystem
	BF404A or B	Tape cabinet, 60 or 50 Hz
	BY3G7A or B	Streaming tape unit, 60 or 50 Hz
9730 - 1		Tape/disk subsystem
	BF405A or B	Tape/disk cabinet, 60 or 50 Hz
	FA7B5A	Control module 3 (CM)
	PA5R2F	Fixed storage drive (FSD)
	BY3G7A or B	Streaming tape unit, 60 or 50 Hz
	GK 429A or B	Power option, 60 or 50 Hz
9836 - 1	FA7B5A, PA5R2F	Disk storage option (1 CM3 and 2 FSDs)
9836 - 2	BZ202A, GK429A or B, FA7B5A, PA5R2F	Disk subsystem (disk cabinet with 60- or 50-Hz power option, 1 CM3, and 2 FSDs)
9836 - 3	BZ202A, GK429A or B, FA7B5A, PA5R2F	Disk subsystem (disk cabinet with 60- or 50-Hz power option, 2 CM3s and 4 FSDs)
9836 -215	AT505A	Disk cable option - 15 ft
9836 -275	AT503A	Disk cable option - 75 ft
9853 - 1	FA7B5A, PA2A7	Disk storage option. 1 CM3 and 2 expanded module drives (XMDs)
9853 - 2	FA7B5A, PA2A7	Disk subsystem (1 CM3 and 2 XMDs)
9853 - 3	FA7B5A, PA2A7	Disk subsystem (2 CM3s and 4 XMDs)
9853 - 4	PA2A7	Disk storage increment (cabinet with 4 XMDs)
19002 - 1	CC595A or B	System console, 60 or 50 Hz
19002 - 2	CC595C or D	Remote console, 60 or 50 Hz

Contents

Contents

SECTION 1

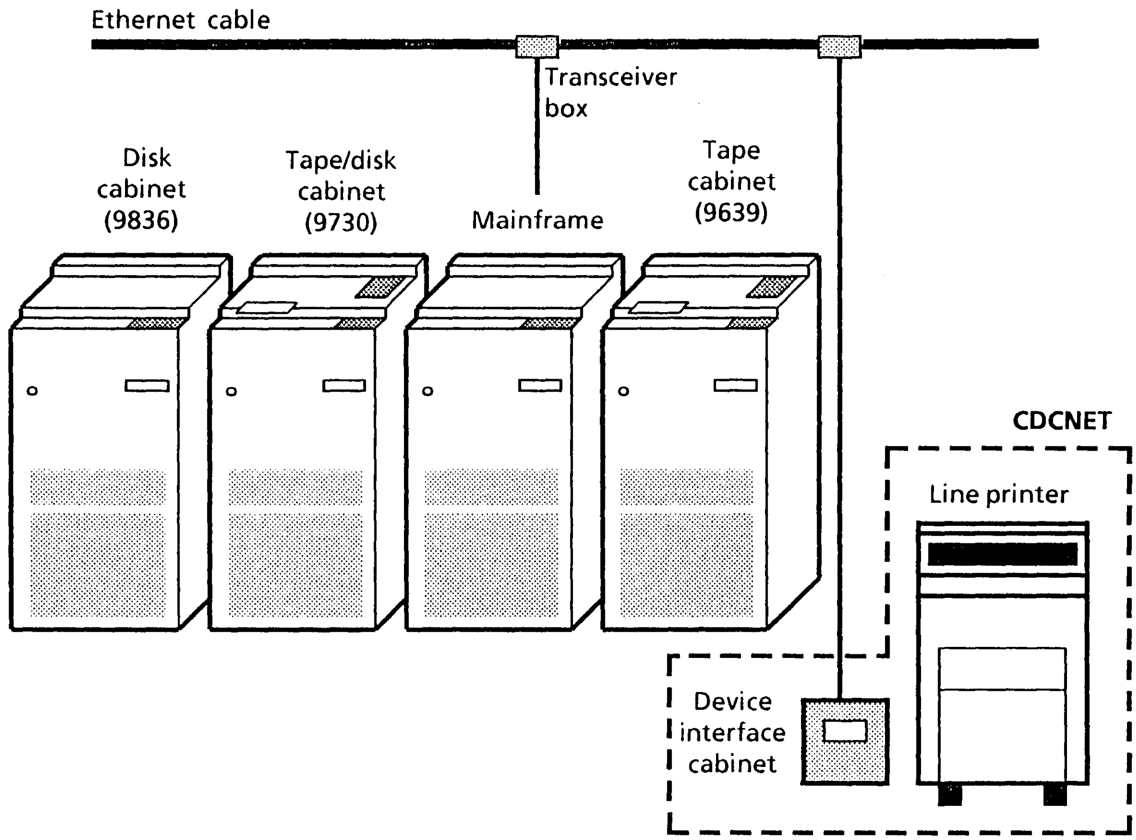
INTRODUCTION TO THE SYSTEM
AND
THE REPAIR PROCESS

The CYBER 930 Computer System contains several cabinets shown in the illustration opposite. The CYBER 930 Computer System also supports Network Operating System/Virtual Environment (NOS/VE) and its product set, VX/VE subsystem, and application software.

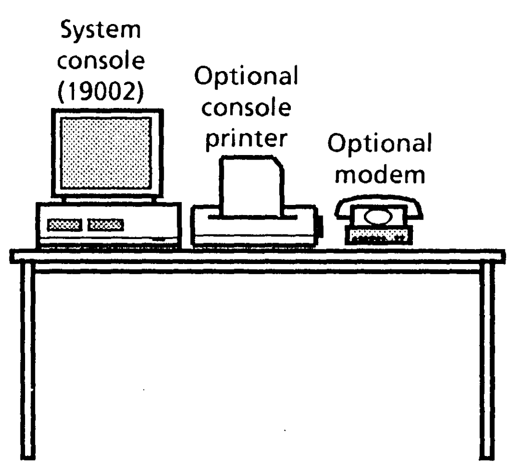
CYBER 930 Computer System

- The 930 or 932 mainframe houses:
  - -- The central processing unit,
  - -- One or two input/output clusters, each with five peripheral processors and six input/output channels,
  - -- Central memory that contains 8 to 64 megabytes,
  - -- The maintenance support system that has maintenance access control and a two-port multiplexer,
  - -- The power distribution and warning system,
  - -- One or two integrated communications adapters,
  - -- One or two intelligent small magnetic tape adapters,
  - -- Optional channel converter.
- The 19002 Console comprises a built-in floppy disk drive and hard disk drive, two RS232 serial ports for communications, and a parallel interface port for an optional console printer. On the 19002 Console, you can initialize the hardware and establish NOS/VE. Before initialization, you can use the console and its maintenance software to run offline diagnostics and other maintenance utilities.
- The 9836 Disk Subsystem contains two or four fixed storage drives, one or two control modules, and a power control unit;
- The 9639 Tape Subsystem contains a streaming tape unit;
- The 9730 Tape/Disk Subsystem serves as an additional peripheral cabinet or replaces the disk subsystem and the tape subsystem. The tape/disk subsystem houses two fixed storage drives, one control module, one streaming tape unit, and a power control unit;
- The transceiver box links the Control Data Distributed Communications Network (CDCNET) and other Ethernet-compatible networks to which the printer, terminals, and work stations are connected. The CYBER 930 Computer System supports CDCNET and its compatible Ethernet network by way of the transceiver box to the integrated communications adapter in the mainframe.

Components in the CYBER 930 Computer System



Equipment	Width	Depth	Height	Weight
Mainframe	620 mm 24.4 in	1041 mm 41.0 in	1220 mm 48 .0 in	240 kg 528 lb
Disk cabinet	620 mm 24.4 in	1041 mm 41.0 in	1220 mm 48.0 in	368 kg 812 lb
Tape cabinet	620 mm 24 .4 in	1041 mm 41.0 in	1220 mm 48.0 in	160 kg 352 lb
Tape/disk cabinet	620 mm 24 .4 in	1041 mm 41 .0 in	1220 mm 48.0 in	322 kg 710 lb
System console (CCU)	365 mm 14.4 in	378 mm 14.9 in	330 mm 13.0 in	13.1 kg 29 lb



C2020

How the Equipment Is Interconnected

The mainframe uses cable interfaces to communicate with the console and its peripheral subsystems. The paragraphs below and the figure on the right give an overview of how the equipment is physically interconnected.

Inside the Mainframe

Each mainframe element, such as the central processing unit (CPU), tape adapter, and central memory (CMEM), is physically one or several paks in a card cage. A *pak* is a Control Data term for *logic board.* Communication between mainframe elements (logic paks) is through an integrated printed circuit backpanel.

External communication between mainframe elements and peripheral subsystems and console is also through the backpanel. Cable drops extend the interfaces from the backpanel to a bulkhead connector panel where all external cables to the peripherals and console are connected.

Console to Mainframe

The 19002 Console uses a special Control Data interface that provides power control to the system to communicate with the two-port multiplexer in the mainframe. Refer to the figure for cable routing.

Mainframe to Communications Subsystem

The mainframe communicates with the communications subsystem (CDCNET) through an integrated communications adapter (ICA). The ICA is a logic pak that connects the integrated controller interface (ICI) of the mainframe and an Ethernet serial interface of the communications subsystem. Refer to the figure for cable routing.

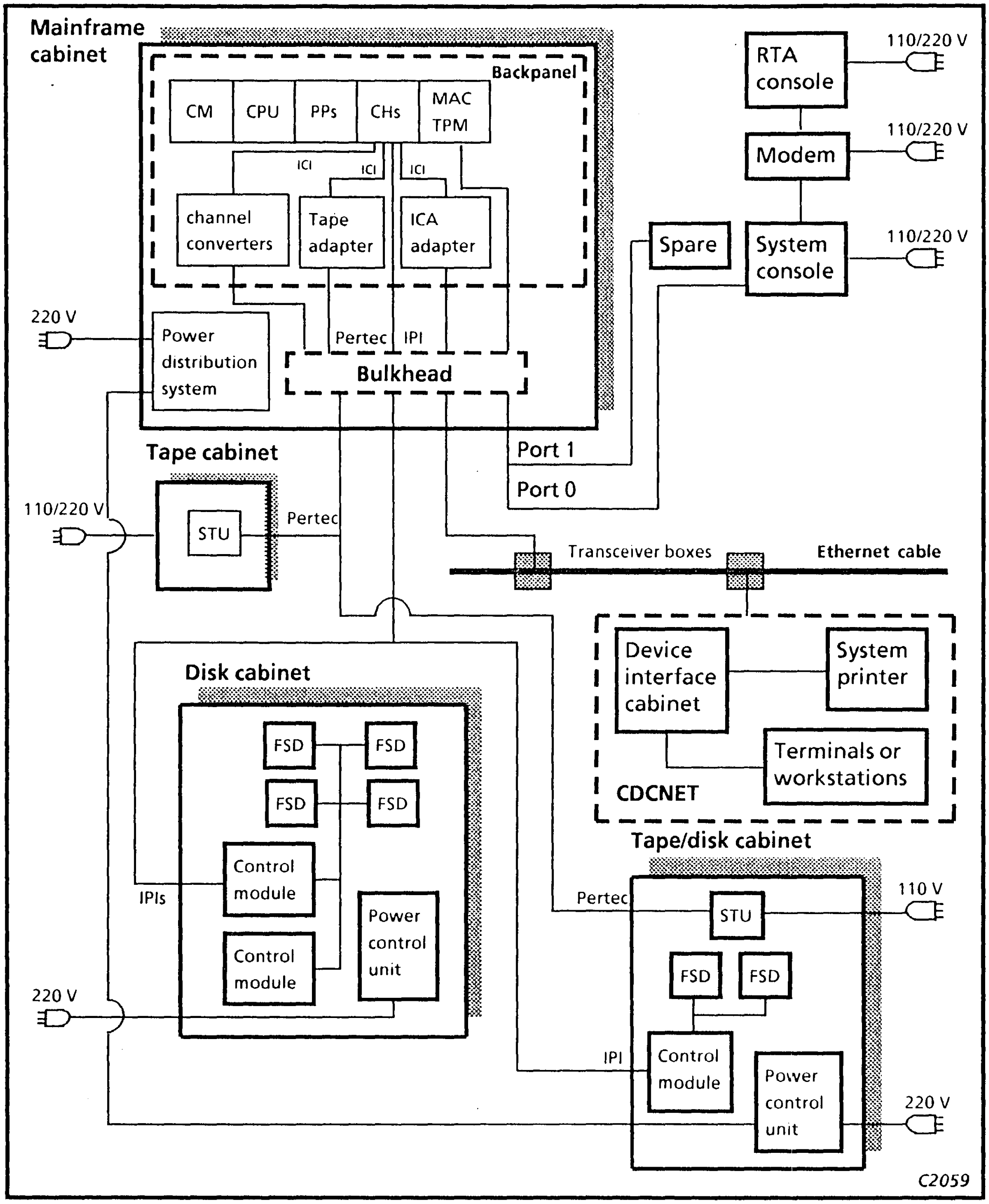
Mainframe to Tape Subsystem

The mainframe communicates with the streaming tape unit (STU) through a tape adapter. The adapter is a logic pak that connects the ICI of the mainframe and the industry standard interface (Pertec) of the STU. Refer to the figure for cable routing.

Mainframe to Disk Subsystem

The mainframe communicates with the disk subsystem by way of the intelligent peripheral interface (IPI). An ANSI level-3 (IPI-3) interface is between the mainframe and the control module, where as a level-2 interface (IPI-2) is between the control module and the fixed storage drive. IPI levels are defined in appendix A, in the Glossary of Terms and Acronyms. The mainframe power system controls power to the power control unit of the peripheral cabinet that contains disk subsystems.

The Equipment Interconnection



Using the System Console for Maintenance

The console is the main tool for maintaining and troubleshooting system problems online or offline. You can run utility programs or execute diagnostics by selecting from the console main menu. The console also gives online help and a utility to establish a remote link for technical assistance. You should be familiar with the features and operation of the console for maintenance purposes.

Mode of Operation

The system console operates simultaneously in two modes: system mode and console mode. Each mode of operation has its own screen format. Because only one screen format can be displayed at a time, use <Alt F2> to switch between these displays.

Console Mode

The offline environment uses the console mode. You can view the format of the console mode from the Global Help menu. The next module, Console Help Displays, gives more information about the Global Help menu and shows how to view it. In console mode, the console is treated as an *intelligent* device--software in the mainframe can communicate with programs in the console without displays.

System Mode

The online environment uses system mode. In system mode, keyboard input controls NOS/VE operation, the console becomes a dump terminal, and NOS/VE controls the screen format.

Offline Maintenance

If the mainframe power is off and you power on the console or press <Ctrl Alt Del> and <Esc> to reset the console, the console displays the main menu. When you select Maintenance from the main menu, you can see more maintenance features and utilities as shown in the module, The Console Menu Tree.

When you select Engineering Maintenance from the Maintenance menu, you can access more maintenance features and technical support functions to isolate the problem to a field replaceable unit.

For more maintenance functions, you can access a global functions menu from any submenu. The console software activates the function keys so that they perform special functions. The functions and function keys that you need to know to maintain the system as well as the Global Functions menu are described in subsequent pages.

Online Maintenance

NOS/VE monitors and analyzes most error conditions and displays the applicable error message to indicate the required maintenance action. Under NOS/VE, you can also examine the System Engineering Log or execute the following maintenance software products from the console or a network terminal:

- Hardware Performance Analyzer/Virtual Environment (HPA/VE)
- Maintenance Application Language for Equipment Testing (MALET/VE)
- Diagnostic Virtual System (DVS)
- System Validation Suite (SVS)

A fault detected by the above products is displayed in one of the following ways: in the error incident report, as an error message, or as a fault symptom code.

Console Help Displays

The console provides two kinds of help display for each menu item-- global help and contact-sensitive help.

Contact-Sensitive Help Display

When in console mode, the console software provides contact-sensitive help displays. To look at the help screen of a particular menu item, select the item by pressing the space bar or the arrow keys to move the inverse video bar to the desired item and then press <Alt F1>. If the help screen is available, it is displayed in one of the four corners of the screen. The help screen also displays the current software level in the form of **L??? -R???** at the left-hand corner of the status line.

When the console is in system mode, the operating system controls the help screen. However, for help displays you can use the help function key <Alt F1> in additional to the HELP command.

Global Help

Inside each help display in console mode, you can view the General Help menu by pressing <F1> or <Alt F1>. For example, press <Alt F1> to show the help display, then press <F1> to display the General Help menu. The General Help menu is an overview of all console operations and introduces you to the console software. The structure of this menu is shown in the following figure. If you have access to the system console or a remote console, view the entire General Help menu before you move on to subsequent modules.

Structure of the General Help Menu

GENERAL HELP MENU

Using The Help System

Using the Menu System

Changing System Parameters

Console Mode Function Keys

System Mode Function Keys

Menu Tree Structure

Menu Index

System Mode Function Keys

Below is a list of the most frequently used function keys when the console is in system mode. A detailed list of the function keys is available online through the Global Help menu when the console is in console mode, or through the help function key <Alt F1> when the console is in system mode.

System mode also supports special local keys. These keys control the visual aspects of the screen. See the General Help menu or the CYBER 930 Computer System Guide to Operations [Control Data publication 60469560] for details.

The Console Keys

Console Key	Function
<Tab>	Moves the cursor to the next input line.
<Return>	Moves the cursor to column one of the next line.
<Ctrl End>	Clears to the end of the line.
<Del>	If the cursor is on an input line, <Del> moves the cursor left one character and replaces that character with a space.
<F7>	Toggles between system mode and monitor display driver.
<F9>	Expands the NOS/VE window containing the cursor.
<F10>	Shrinks the window to its minimum length. This key applies to the Critical Display and Operator Action windows only.
<Ctrl LeftArrow>	Restores the window to its original position. This key undoes the effects of function keys <F9> and <F10>.
<PgDn>	Advances the position of the cursor within a table.
<PgUp>	Decrements the position of the cursor within a table.
<-> (on keypad)	Takes the current line to the bottom of the window.
<+> (on keypad)	Take the current line to the top of the window.
<Ctrl Home>	Refreshes the entire console display.
<End>	Causes a pause break in a system job that allows the user to take control when a command takes longer than expected.
<Ctrl S>	Stops screen scrolling.
<Ctrl Q>	Resumes screen scrolling.

Console Function Keys

When you press the console function keys, the console software performs special functions that help you maintain the system. The following are the most frequently used function keys.

The following function keys are available in both console-mode operation (offline) and system-mode operation (online):

Keyboard Entry	Function
<Alt E>	Terminate command buffer execution.
<Alt F1>	Help.
<Alt F2>	System or console mode toggle.
<Alt F4>	Restore remote keyboard.
<Alt F6> *	Inserts delay function in command buffer.
<Alt F8> *	Records or closes command buffer file.

The function keys below are available in console-mode operation only:

Keyboard Entry	Function
<*X* F1>	General help. Available from the help display only. *X* can be either <Alt>, <Shift>, <Ctrl>, or unshifted.
<Alt F3>	Allows interconsole messages.
<Alt F5>	Terminates remote link.
<Alt F10>, X	Toggles maintenance mode. *X* can be **Y** to enable asterisked functions, or **N** to disable asterisked functions.
<Alt F7> *	Begins or resumes command buffer execution.
<Alt F9> *	Displays global function menu.
<Alt D> *	Enables demonstration mode.
<Alt Q> *	Quit. Exit to DOS.

Alt F1 - Help

<Alt F1> provides contact-sensitive help information that is displayed in a corner window of the screen. When you press <UpArrow> and <DownArrow>, the content of the window pages forward and backward.

Alt F1, x F1 - General Help

Press <Alt F1> to display any help screen, then press either <Shift F1>, <Ctrl F1>, <AltF1>, or <F1> to access the Global Help menu.

Alt F2 - System/Console Mode Toggle

Press <Alt F2> to switch the display from console mode to system mode, or from system mode to console mode. Note that console software automatically switches from console mode to system mode if a deadstart to NOS/VE is successful.

Alt F3, Alt F4, and Alt F5 - Remote Technical Assistance

Use <Alt F3>, <Alt F4>, and <Alt F5> function keys during the remote technical assistance (RTA) operation. They are explained in more detail in section 5.

Alt F10 - Toggles Maintenance Mode

Press <Alt F10> to display the prompt for enabling or disabling maintenance mode. Enter **Y** at the prompt to enable maintenance mode. Enter **N** to disable maintenance mode. In maintenance mode, the following additional functions are available:

Alt E, Alt F6, Alt F7, or Alt F8

Use <Alt E>, <Alt F6>, <Alt F7>, and <Alt F8> function keys in command buffer operations. Command buffer is a utility that saves your most frequently used sequences of keystrokes in a file for future execution.

Alt F9 - Global Function

<Alt F9> gives you access to features that you may use in troubleshooting mainframe problems such as: dump PP memory, examine PP or maintenance registers, and check hardware status.

Alt D - Demonstration Key

<Alt D> puts the console in a demonstration mode. You can use it to become familiar with the console software without having access to a mainframe.

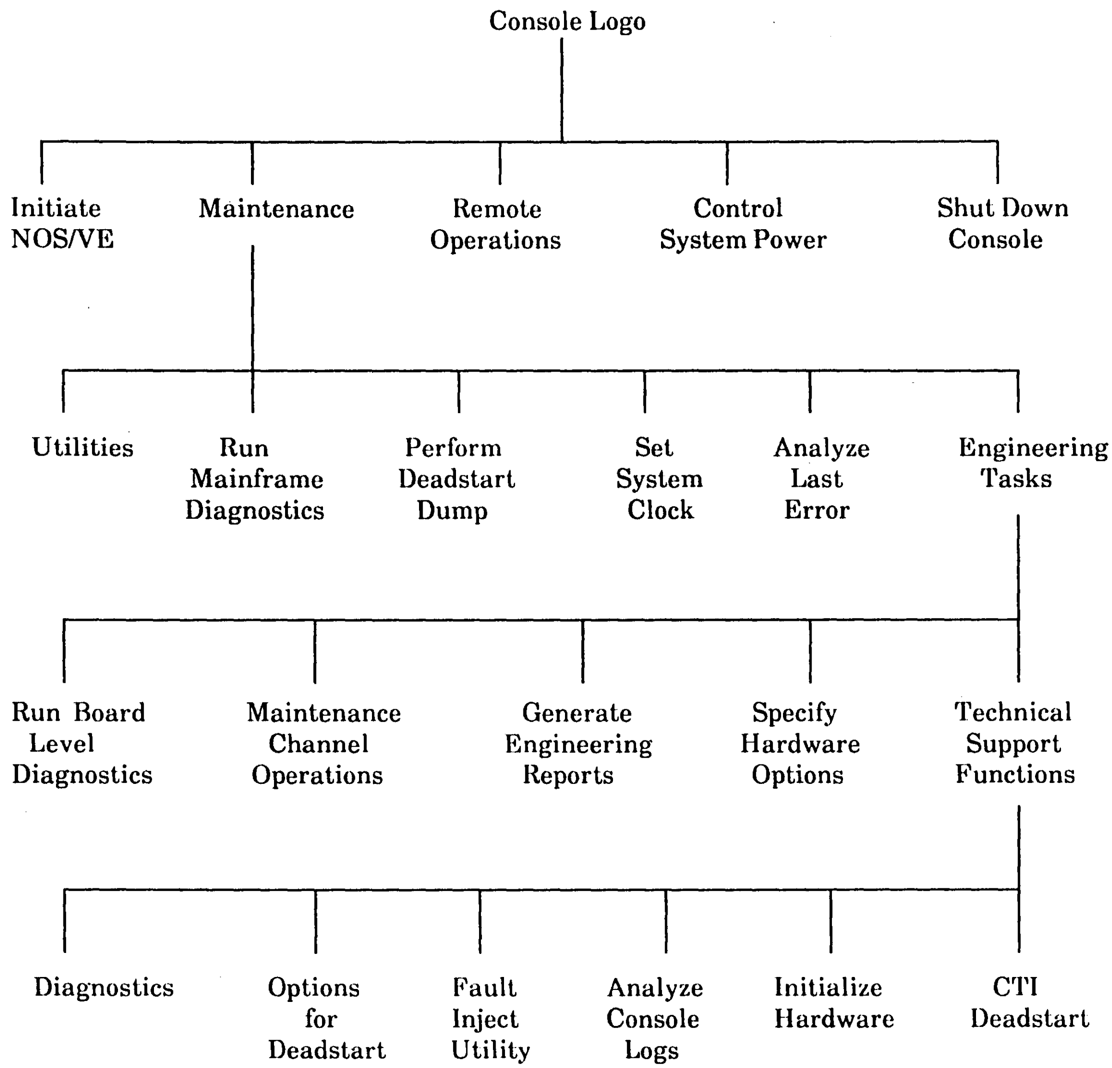
Alt Q - Quit

<Alt Q> allows you to exit the console software and enter MS-DOS. Use this key only when the console displays the main menu. Press <Ctrl Alt Del> to exit MS-DOS and to restart the console software.

Console Menu Tree

The following is a condensed version of the menu tree that shows the major items that you require to maintain the system. A more detailed menu tree is in the Global Help menu.

Menu Tree of the Console



The Run Mainframe Diagnostics or Run Board Level Diagnostics menu selection provides you with an easy way to run the diagnostics automatically without any parameter input.

The Diagnostics option under the Technical Support Functions menu provides manual control of the execution of one or more offline diagnostics that you require to isolate the problem in the mainframe and critical peripherals. Refer to the subsequent module, Diagnostics Main menu, for more details.

You can also access the Global Functions menu shown below anywhere in console mode by pressing <Alt F10>, **Y**, and then <Alt F9>. The three items that you need to know more about in this menu are:

- Hardware status
- Dump PP memory
- Reconnect with TPM

You can access the help display to get more information about each menu item.

Global Functions Menu

```
GLOBAL FUNCTIONS

Serial I/O Functions
Hardware Status
Maintenance Register
Engineering DEC Interface
Configure Critical Devices
Dump PP Memory
PP Register Display
Binary Patch Utility
Reconnect with TPM
```

Diagnostics Main Menu

From the diagnostics main menu, you can select the diagnostics shown in the figure opposite. The following is a brief decription of each test or diagnostic. You can also view the decription online from the help display by selecting the item you want and pressing <Alt F1>.

Subsystem Tests

Load standalone tests from the console to a peripheral processor for execution. Each of the following tests initiates either the subsystem inline (onboard) diagnostics or the echo test. The console monitors the peripheral processor for indications of errors. You can use the subsystem tests to isolate errors in the following subsystems :

- System disk
- Tape drive
- Integrated communications adapter (ICA)
- CYBER 170 channel converter

TPM/MAC Self-Test

The TPM/MAC Self-Test, initiates a self-test of the two-port multiplexer and the maintenance access control hardware. When testing begins, a full screen window displays the test running status.

OCMS Tests

Select OCMS Tests to verify the mainframe paks containing high density chips. Execution control for these tests resides in the console hard disk. There are two kinds of test: chip identifier/signature analysis and interconnect. The identifier/signature analysis runs before the interconnect test.

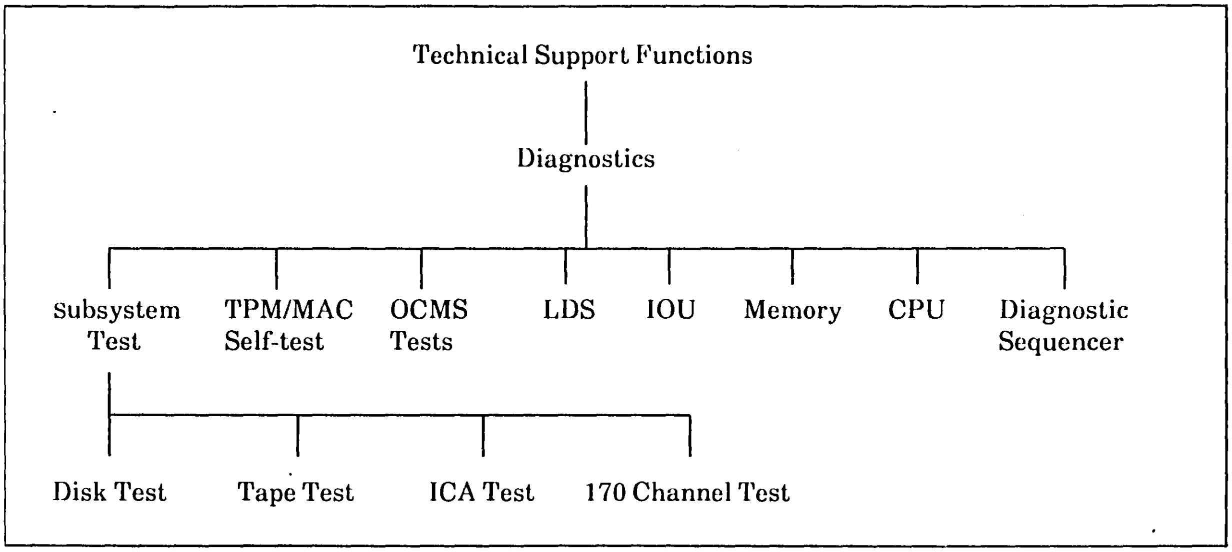
LDS Test

Select the LDS Test to initiate a quick-look diagnostic of the long deadstart sequence. The diagnostic resides in read only memory. The two-port multiplexer loads the diagnostic into the selected peripheral processor memory for execution.

IOU Test

The IOU Test initiates the input/output diagnostic. Select this test to load the console diagnostic disk file to a selected peripheral processor for execution. See the Help display for more information on this test.

The Diagnostics Main Menu Tree



Memory Test

Memory Test initiates execution of the CMT0 central memory test based in the maintenance software library (MSL). See the help display for more about this test.

CPU Test

CPU Test executes the MSL-based FIS0 fault isolation system. See the help display for details about the CPU test.

Diagnostic Sequencer

Select Diagnostic Sequencer to execute in sequence automatically all or a selected number of the above diagnostics. When you execute diagnostics in this mode, the console provides the default parameters for each test. See the help display for more information.

The options Run Mainframe Diagnostics and Run Board Level Diagnostics are functionally the same as Diagnostic Sequencer. They also execute the same set of diagnostics but in a predefined sequence.

Powering the System On and Off

You can power the system on and off either by local or remote control. For servicing, power an individual cabinet (except for the tape cabinet) on and off by setting the service switch.

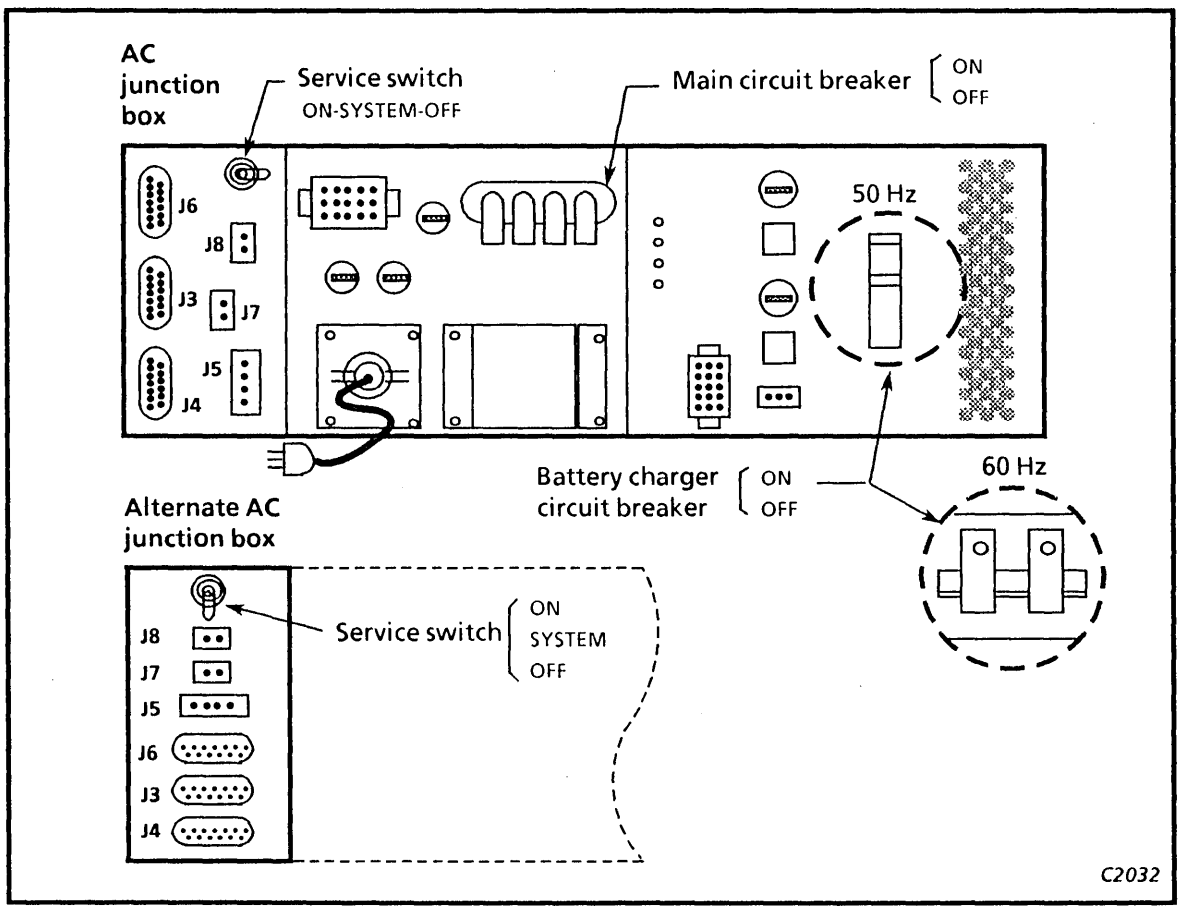
Tape Cabinet

The tape cabinet does not contain the power control unit--it is not under system control. Use the on/off switch on top of the tape deck to control logic power; plug and unplug the power cord from the wall outlet to control cabinet power.

Console Control

Use the local or remote console to power the system on and off. For control from the console, set the main circuit breaker in each cabinet to ON and set the service switch to SYSTEM. Remove the rear door of each cabinet to access the main circuit breaker and the service switch. The main circuit breaker and the service switch are shown in the following diagram.

Main Circuit Breaker and Service Switch



Power Control Using the Local Console

When you power the console on or press <Ctrl Alt Del> and <Esc> to reset it, the console is initialized and displays the power status of the mainframe. Then the main menu appears.

You can power the system on and off from the Power Control submenu of the Console main menu. The power control submenu allows you to toggle mainframe power. If the power is ON, the display indicates the power and the two-port multiplexer status shown below.

Control System Power Submenu

```
        CONTROL SYSTEM POWER

    Mainframe Power is ON
        Power System is GOOD
        Two Port Mux is ON

    Press F10 to turn power OFF
```

Press <F10> to turn the power off. The console then locks keyboard control until the power status has changed to **Mainframe Power is OFF**. To turn the power on again, press <F10>.

While NOS/VE is running and before powering off the system, you must ask the operator to terminate NOS/VE.

NOTE

> When you terminate NOS/VE and power off the system, make sure that all tape subsystems not under the console's control are also powered off. If the tape subsystem remains on and you power on the system to reestablish NOS/VE, unpredictable responses are sent to NOS/VE.

Power Control Using the Remote Console

If the local console has a modem for remote technical assistance, you can establish a telephone link with the local console from your remote console. Once the link is established, control of the console operation passes to the remote console. Then power the system on and off the same way as with the local console. To establish the remote link, see section 5, Maintenance Aids and Utilities.

Emergency Stop Button

The mainframe has an emergency stop button on the front door. Only in emergency situations should the operator use this button. Do not use this button for powering down the system in normal situations. When you press the emergency stop button, all main circuit breakers trip. You must then open the rear door of every cabinet to reset the main breaker.

Main Circuit Breaker and Service Switch Control

The mainframe, disk cabinet, and the tape/disk cabinet each have an AC distribution rack that contains a main circuit breaker and a service switch. If the cabinet has the battery backup option, the AC distribution rack also has a battery charger with an on/off switch shown in the figure on the next page.

The default settings of the cabinets for console power control are:

- Main circuit breaker set to ON
- Service switch set to SYSTEM
- Battery charger circuit breaker set to ON

The block diagram of power control and the table on the next page give you an overview of the power control unit in each cabinet. Guidelines for using the main circuit breaker, the service switch, and the battery charger circuit breaker to power the cabinet on and off for maintenance service are as follows:

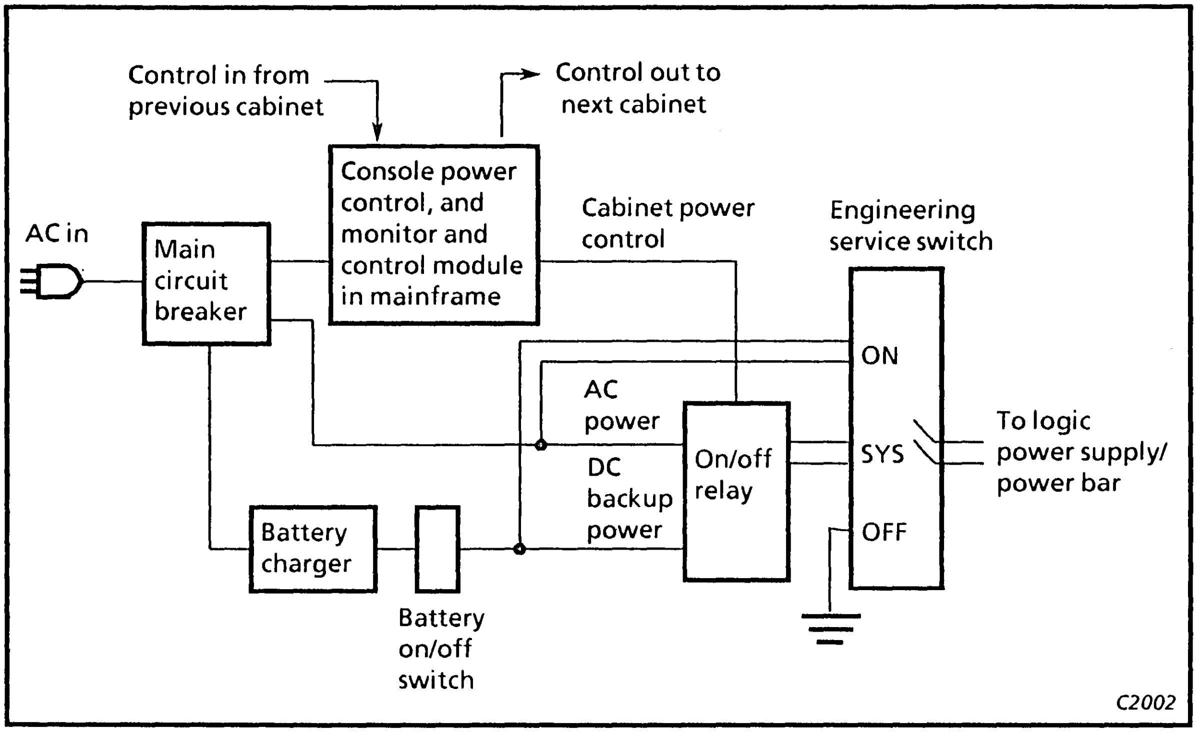
- Use the service switch to enable and disable power to the logic paks or logic boards. This way you can replace logic paks without interfering with power to the other cabinets.

- Use the main circuit breaker to enable and disable power when servicing the cabinet that contains the power assemblies. Power to the other cabinets is interrupted.

- If the battery backup option is in a cabinet, always set the battery charger circuit breaker to OFF when servicing the inside of the cabinet.

The main circuit breaker controls both AC and DC power from the battery backup option to the cabinet. The service switch functions only when you set the main circuit breaker to ON. Note that before you can set the switch to another position, you must pull its shaft forward somewhat.

Block Diagram of Power Control



Console Power Control	Main Circuit Breaker	Service Switch Position	Power Available to Cabinet	Power to Other Cabinet (s)
On	On	On	Yes	Yes
On	On	System	Yes	Yes
On	On	Off	No	Yes
On	Off	On	No	No
On	Off	System	No	No
On	Off	Off	No	No
Off	On	On	Yes	No
Off	On	System	No	No
Off	On	Off	No	No
Off	Off	On	No	No
Off	Off	System	No	No
Off	Off	Off	No	No

Introducing the Repair Process

You must respond to **all** service calls for corrective maintenance by determining the kind of maintenance task to perform and by resolving the problem quickly. Follow the corrective maintenance repair process illustrated in the flowchart in this book. You must also complete each major step in the flowchart before moving on to the next step.

NOTE

Preventive Maintenance is not required for the CYBER 930 Computer System. However, while you are onsite to perform corrective maintenance, check the condition of the air filters in each cabinet.

The Repair Process for Corrective Maintenance

Initially, the dispatcher of the Incident Management System (IMS) responds to the customer's service call and gathers all the relevant fault symptoms and site information from the customer. The dispatcher then passes this information on to CYBER Hardware Support (CHS) for screening.

CHS personnel analyze the problem and try to isolate it to the field replaceable unit (FRU). They may either use the information provided by the dispatcher, or may contact the customer to establish a remote data link to run diagnostics. CHS or the IMS dispatcher will tell you either to replace the FRU or to continue troubleshooting onsite. The maintenance kit(s) you carry to the site depend on this information.

A maintenance kit contains subassemblies that are grouped according to subsystem or functional area. For the contents of the maintenance kits, see section 4 module, Parts Listing of Maintenance Kits. *However, in countries that do not have IMS, the customer engineer or technical support should contact the customer directly and perform the screening and isolation before the site visit.*

If the maintenance decision is to replace a FRU, the steps you must follow are:

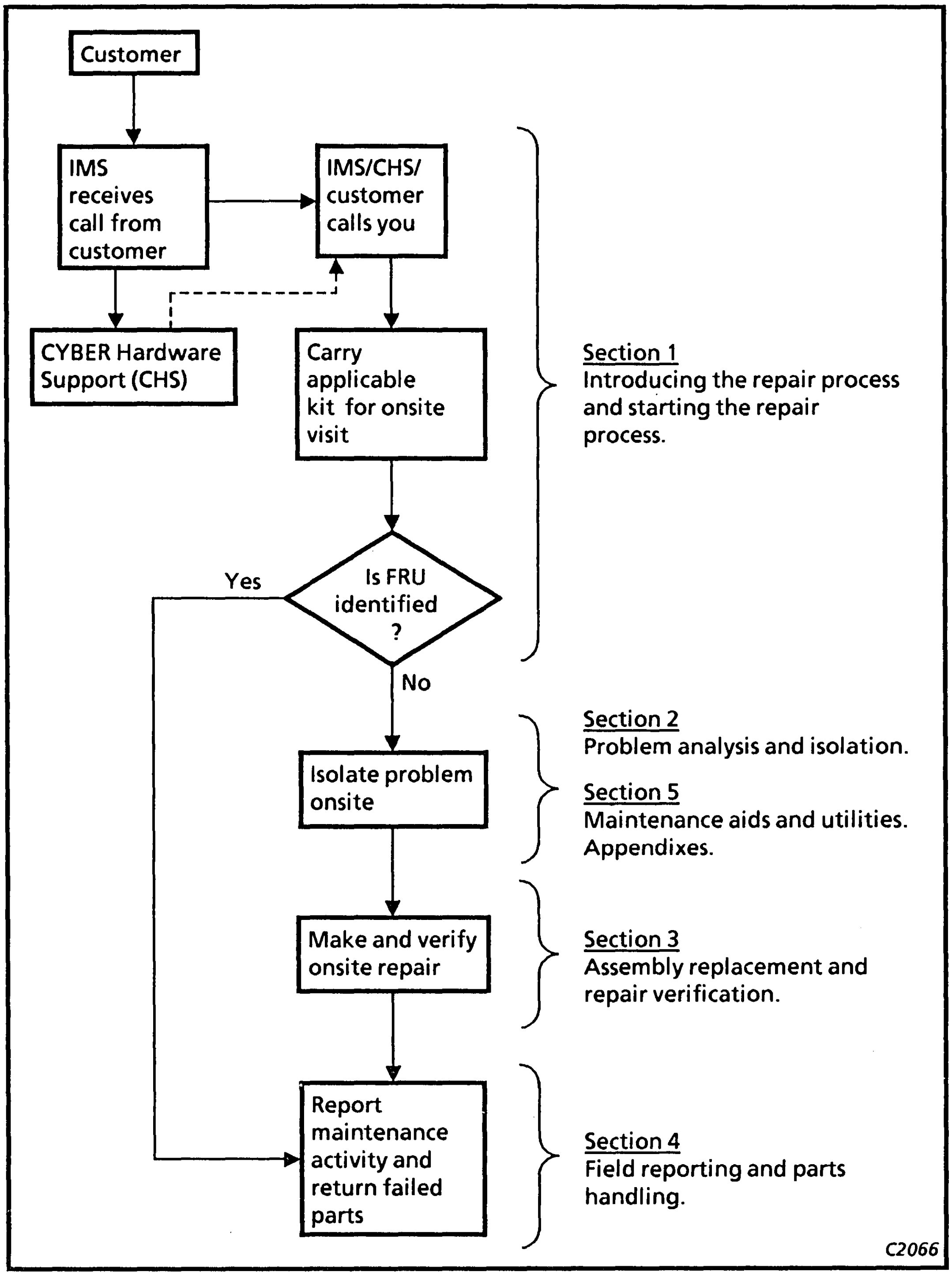
1. Replace the FRU onsite;
2. Verify repair by running confidence tests;
3. Report the maintenance activity and return failed parts.

If the maintenance decision is to further troubleshoot the problem onsite, the steps you must follow are:

1. Isolate the problem onsite with customer assistance or by technical escalation;
2. Replace the FRU onsite;
3. Verify repair by running confidence tests;
4. Report the maintenance activity and return the failed parts.

The sections in this book are organized for easy reference according to the repair process shown in the flowchart. To start the repair process, refer to the next module, Starting the Repair Process.

The Repair Process



Starting the Repair Process

To start the repair process, contact either incident management system, CYBER hardware support, or the customer to ask for full information and fault symptoms about the problem.

For Identified FRUs - Refer to Section 3, Replacement and Verification

If the incident management system or CYBER hardware support identifies the field replaceable unit for you, refer to the quick reference table in section 3 for the removal and replacement procedure that you require for the onsite repair.

For procedures for field replaceable units in the following subsystems, refer to the hardware maintenance manuals shown:

Subsystem	Manual Title	Publication Number
Fixed storage drive in the disk or tape/disk cabinet	Fixed Storage Drive Hardware Maintenance Manual	83325610
Expanded module drive in a standalone cabinet	Expanded Module Drive Hardware Maintenance Manual	83325830
Streaming tape unit in the tape or tape/disk cabinet	Streaming Tape Unit Hardware Reference/ Maintenance Manual	49763100
Tape controller and unit in the IPI tape cabinet	311xC - OHI/308xC - OHI CYBER Magnetic Tape Maintenance Manual	60000409
System printer Maintenance Manual	400/800 Linewriter	44689032
Communications (DI cabinet)	CDCNET Troubleshooting Guide	60462630
System console	Zenith Service Guide Z-130/140 PC Series	41621164

For Unidentified FRUs - Refer to Section 2, Troubleshooting

If incident management system or CYBER hardware system cannot isolate the problem to field replaceable unit level, isolate the problem on the customer's site. Refer to the table of contents at the beginning of section 2 to start the troubleshooting process. The fault symptoms, and information from the customer or CYBER hardware support, are good indications of where you should start troubleshooting in section 2.

When to Escalate the Problem

Escalate the problem to your manager or ask for technical assistance to speed up the repair process. Escalation is required in the following situations:

- When three or more undefined system interruptions occur within a 14-day period;
- When the level of unscheduled interruptions of any maintained system or subsystem results in customer dissatisfaction;
- When the severity of the product or service problem exceeds the accumulated downtime (outage) specified as follows:

	Severity 1	Severity 2	Severity 3
Outage Time	Two Hours	Four Hours	Eight Hours

Where severity codes are defined as follows:

Severity 1: A high level of customer dissatisfaction exists requiring immediate resolution, or the customer is unable to use the system.

Severity 2: The customer can use the system with minor restrictions. The condition is not critical to overall operation.

Severity 3: A way to get around the problem has been found. A Technical Action Request (TAR) or Programming System Report (PSR) may be generated and evaluated, and action taken as required.

When none of the above conditions exist, the problem has not been isolated to a field replaceable unit, and there are no more clues to continue the troubleshooting process, escalation is at your discretion.

How to Escalate

Technical assistance is usually by telephone or remote link from the customer's console to the remote service console. If you are unfamiliar with establishing a remote link for technical assistance, refer to the section 5 module, Establishing a Remote Link for Technical Assistance.

SECTION 2

PROBLEM ANALYSIS AND ISOLATION - TROUBLESHOOTING

Console Failure

When you turn the CC595 console on, it performs a series of self-tests. If the console fails a test, it displays an error message. If the following messages are displayed, refer to the Zenith Service Guide Z-130/140 PC Series [Zenith publication 41621164]. In addition to the console self-tests, there are diagnostic tests that you can run from the keyboard.

Error Messages

ERROR: CPU failure!
ERROR: ROM checksum failure!
ERROR: RAM failure!
ERROR: Parity hardware failure!
ERROR: Parity failure!
ERROR: Timer interrupt failure!
ERROR: No keyboard code received!
ERROR: CRC error!
DISK ERROR: Bad disk controller!
DISK ERROR: DMA overrun error!
DISK ERROR: Sector not found!
DISK ERROR: Invalid address mark detected!
DISK ERROR: Seek failure!
DEVICE ERROR

NOTE

If the Zenith Service Guide directs you to replace the console central computing unit or the hard disk, you must reinstall the console software. Refer to section 3 module, Replacing the System Console, for the procedure.

Initiate Diagnostics Manually

Before you can execute diagnostics manually, press and hold <Ctrl Alt Ins> to get into console monitor mode. While the monitor -> prompt is displayed on the screen, type **TEST** to see the following:

```
CHOOSE ONE OF THE FOLLOWING
1. DISK READ TEST
2. KEYBOARD TEST
3. MEMORY TEST
4. POWER-UP TEST
5. EXIT

ENTER YOUR CHOICE:
```

To run a test, press the corresponding number key. With the exception of the keyboard test, a test runs until it locates an error or you press <Esc> to stop the test. The keyboard test operates on a key-to-key basis. To end a monitor-mode session, press and hold <Ctrl Alt Del>.

Troubleshoot Common Problems

Use the troubleshooting table below as a checklist to identify the possible causes of common console problems.

Troubleshooting Table

Condition	**Possible Cause / Maintenance Action**
Drive not ready or console does not boot automatically.	• The console cannot access the hard disk - Power the console off, wait 5 seconds, power the console on again. - Replace the disk controller. - Escalate to next level of support.
Nothing happens at power on; the green light on the front panel does not light	• Power cord not plugged in. • Power not on at wall outlet. Check with a different appliance. • Power switch on the central computing unit (CCU) not on. • Cable that attaches light and speaker not attached to CPU card in the CCU.
System reset to power-on point or disk keeps on rebooting	• Loose power cord.
No video (blank screen) on the monitor	• Monitor not plugged in or turned on. • Monitor not properly connected to CCU. • Brightness control turned down. • Failure of CPU card in CCU during initial tests. Refer to the Zenith Service Guide.
Insufficient brightness	• Brightness control turned down.

If the system is down, one of the following can be the cause:

- Logic problem or fault in the mainframe cabinet;
- Fault in system-critical peripheral;
- Power failure or environmental fault;
- Software or application software problem.

Based on the symptom information from the customer, refer to the appropriate modules for your next maintenance action.

Mainframe Logic Problem

If initiating NOS/VE fails with a system error message, refer to the following module, Responding to a System Message, for your next action.

If the console provides no system message at all, run offline mainframe diagnostics and error analysis from the console. Refer to the module, Responding to Problems without System Messages, for the procedures.

If you wish to generate a more detailed system error message before you reinitiate NOS/VE, select both Force Hardware Initialize and Include Diagnostic Testing from the System Options menu shown below. If you need a procedure to access this menu and select this option, refer to the section 5 module, Setting the System Options.

System Options Menu

```
            "INITIATE NOS/VE" OPTIONS              PAGE 2 of 2

FORCE HARDWARE INITIALIZE ....................     YES
   INCLUDE DIAGNOSTIC TESTING ..................   YES
   PERMIT DEGRADES ON ERROR ....................   NO
ENABLE MDD UTILITY .............................   NO
LOAD MICROCODE .................................   YES
PERFORM CM RELOAD FROM .........................   NO
   DEADSTART DUMP TAPE

            "CONSOLE OPTIONS"

ENABLE AUTOMATIC POWER ON ......................   YES

Valid Entries: YES, NO
```

Disk Subsystem Problem

The permanent files and CYBER initialization package of the operating system reside in a disk unit called the system disk. The system is down when access to these files is not possible. This may occur when the system disk has an unrecoverable error, power failure, control module failure, or channel failure.

If you suspect the problem is associated with the system disk, select Include Diagnostic Testing from the system options menu before you initiate NOS/VE. Select this menu from the Utilities of the Maintenance menu. This selection enables the console to execute a disk test during deadstart. If this test detects an error condition, error message(s) from the console indicate a disk-related problem. In such situations, refer to Disk Deadstart Troubleshooting in this section for procedures to run the offline disk test.

Tape Subsystem Problem

If the tape subsystem brings the system down during a tape operation such as reloading system files, updating the Maintenance Software Library, or updating the CYBER Initialization Package in the system disk, this is usually a deadstart problem. If so, run the offline tape test for isolation. Refer to Tape Deadstart Troubleshooting in this section for the procedure.

Power Failure or Environmental Fault

A power failure or environmental fault, such as an excessively high temperature, triggers either a Long Warning or a Short Warning to the operating system. Before terminating, the system then tries to capture enough information on disk for a successful deadstart at a later time. In such a case, ensure the room temperature is within the normal range before referring to Mainframe Power Troubleshooting in this section for further isolation. If the room temperature is too high, call facility personnel to correct the problem.

Software or Application Software Problem

If the symptoms indicate that the software or application software causes the system-down situation, you should reestablish the operating system and reexecute the software or application program. If the operation is still unsuccessful, take a deadstart dump to tape, gather all relevant data and symptoms, and escalate to the next level of support. Refer to the section 5 module, Initiating a Deadstart Dump, for the procedure.

Responding to a System Message

Record the error message displayed on the console. If an optional console printer is available, press <Shift PrintScrn> to print the screen. If a system message appears before you can establish NOS/VE, check the table below for maintenance action. For NOS/VE system messages, refer to the NOS/VE message table. Detailed NOS/VE messages are in the Diagnostic Messages for NOS/VE Usage manual [Control Data publication 60464613].

System Messages (Sheet 1 of 3)

System Message	Maintenance Action
Deadstart Aborted - selected PP is in the off state	Check hardware status of the selected PP under the Global Functions menu. Ensure that the PP is turned on. Reinitiate NOS/VE.
Initialization Aborted -- xxxxxxx where xxxx is the description of the area or subsystem that causes the process to abort.	Run Analyze Last Error utility. Run board-level diagnostic according to the message description.
Fatal: Internal Stack Failure, System Halted or Fatal: Stack Overflow, System Halted	The basic input/output system (BIOS) of the console detects a stack overflow problem. The console is halted but does not affect the NOS/VE operating system. To correct: power the console off, wait 5 seconds. Then power the console on again.
OCMS Test Aborted	Run Diagnostics Log Analysis under the Analyze Console Logs menu for a graphical pak callout. Refer to the module, Responding to Problem without System Messages, for the procedure.
Power Operation Failed	If this message shows up on the Power Control menu, make sure that the console-to-mainframe cable is properly connected. Refer to the module, Power Operation Failing, in this section.

System Messages (Sheet 2 of 3)

System Message	Maintenance Action
Power Status is Failing	If this message shows up on the Power Control menu and the operating system is running well, deferred maintenance is possible. Refer to section 2 module, Power Status Failing, to isolate the FRU.
System Abort XXXXXXXX or System Dead - XXXXXXXXX	
If XX is IOU related error	Run board-level diagnostics according to IOU slots or run Analyze Last Error utility.
If XX is CPU related error	Run board-level diagnostics according to CPU slots or run Analyze Last Error utility.
If XX is CMEM related error	Run board-level diagnostics according to central memory slots or run Analyze Last Error utility.
If XX is OCMS related error	Run OCMS test under Diagnostics main menu or run Analyze Last Error utility.
Unable to Access CIP DS Device	Refer to the module, Disk Coldstart Troubleshooting. If CIP DS Device is tape, refer to the module, Tape Coldstart Troubleshooting.

System Messages (Sheet 3 of 3)

System Message	**Maintenance Action**
Unable to Correctly Communicate with the TPM/MAC/PCU *XXXXXXXXXXXXXXXX* If *XX* is No Response for Function (??), take actions 1, 2, 3, and 5. If XX is PP Error on Function (??), take actions 2, 4, and 5.	1. Check console-to-mainframe cable Ensure mainframe is powered on. 2. Execute Initialize Hardware under the Technical Support Functions menu. 3. Set the three-position toggle switch on the MAC/TPM pak to the upper position and then return to the middle position to reset the pak. 4. Run board-level diagnostics according to PP slot or run diagnostics using diagnostic sequencer under the Diagnostics Main menu of the Technical Support Functions menu. Deselect the OCMS diagnostics to save time. 5. Successively replace the console-to mainframe cable, MAC/TPM pak, and clock pak. **Do not power on the mainframe without the MAC/TPM pak.**
WARNING Using Default Password for Security	Battery problem on the MAC/TPM pak. Try to reinstall the MAC/TPM pak. If this warning message reappears, replace the MAC/TPM pak.
WARNING This machine is not running on an 8 MHZ clock. Console software will not operate properly.	Ensure that the clock speed switch in the bottom right corner of the central computing unit is in the inward position.

NOS/VE Messages

System Message	Maintenance Action
Unrecovered disk errors	Refer to the module, Disk Subsystem, for the detailed message displayed on the console and for the maintenance action to take.
(???) UNCORRECTED (or FATAL) IOU ERROR	1. Terminate NOS/VE. 2. <Alt F2> to return to console mode. 3. Execute the board-level diagnostics according to PP slot(s).
(???) FATAL CM ERROR	1. Terminate NOS/VE. 2. <Alt F2> to return to console mode. 3. Run board-level diagnostics according to memory pak or run diagnostics using Diagnostic Sequencer under the Diagnostics Main menu of the Technical Support Functions menu. Deselect the OCMS diagnostics to save time.
(2??) FATAL CPU ERROR XXXXXX XXXXXXX	1. Terminate NOS/VE. 2. <Alt F2> to return to console mode. 3. Execute the mainframe diagnostics or the board-level diagnostic according to CPU pak. 4. Execute the offline disk test on every disk unit. Refer to the module, Disk Coldstart Troubleshooting, for the procedure and further maintenance action.
(701) ENVIRONMENT WARNING or (70?) POWER WARNING 'System idled due to an XXXX WARNING' XXXX indicates either a LONG or SHORT warning.	1. Correct environmental problem in the computer room. 2. Check the indicators on the monitor and control module. 3. Take action according to the module, Mainframe Power Troubleshooting.

Responding to a FRU Callout or Fault Symptom Code

If the console calls out a field replaceable unit (FRU), see section 3, Assembly Replacement and Repair Verification. However, if the FRU list is more than two paks and is called out by the On-Chip Maintenance System Test, you can further isolate the fault to a particular pak from a special procedure in the next module using the On-chip Maintenance System Test again. If replacing the FRU cannot fix the problem, record the fault symptom codes that accompany the callout list and escalate to the next level of support.

FRU Callout

For a FRU callout, the console displays the name and location of the logic pak that needs replacing. Replace the FRU according to the procedure for mainframe cabinet subassemblies in section 3. If the console displays more than one logic pak, replace the pak at the top of the list first. Then rerun the test or diagnostic that detected the error to verify the repair.

If the test still fails and displays the same callout, replace the second FRU on the list. Repeat this sequence until you replace the right logic pak and the test or diagnostic detects no errors. If you replace all the called-out paks and are still unable to verify the repair, record the fault symptom codes . You can also display the fault symptom codes from the console activity log.

When you escalate to the next level of support, give Technical Support the fault symptom code(s). Technical Support enters the code in a fault symptom data base that supplies suggestions for the next action you should take.

Fault Symptom Code

When maintenance software detects an unrecoverable error on the mainframe while running offline diagnostics, the console displays the fault symptom code with the pak callout. The console software also logs the fault symptom code in the console activity log.

The fault symptom code is 12 alphanumeric characters in the following format:

FAULT SYMPTOM CODE = XXXX XXXX XXXX

The code describes the problem in detail. For example, the code could contain the test, section or subsection of the test that detects the error, the contents of the registers, and the suspected chip and pin numbers that cause the fault. If the fault symptom is displayed in the console activity log, enter it on your Maintenance Activity form.

NOTE

If the customer does not have a maintenance contract after the warranty expires, the FRU callouts or fault symptom code are blocked. You may install the proprietary isolation software that is on floppy to examine the error log to isolate the FRU. For details, refer to section 5 module, Removing or Installing Isolation Privileges.

How to View the Console Activity Log

Press <ESC>s until you return to the main menu where you type the following keyboard sequence:

M to display the Maintenance menu.
E to select Engineering Tasks.
E to select Generate Engineering Reports.
D to display the console activity log.

If the log contains more than one display, the last display reflects the latest console activities. Press <PgUp> to view previous screens. The log contains the time, date, console activities, error messages, and fault symptom codes associated with the activities as shown in the following example:

Console Activity Log

```
11:43:10 29MAR87 UNCORRECTED ERROR - (97) No Response for Function "91"
12:49:38 29MAR87 *** COLDSTART TO NOS/VE ABORTED
13:12:04 29MAR87 TPM/MAC Diagnostic Terminated with Error(s)
13:13:41 29MAR87 *** INITIALIZE HARDWARE INITIATED
13:13:48 29MAR87 *** INITIALIZE HARDWARE ABORTED
13:18:25 29MAR87 IOU PPs Not Communicating with TPM
17:06:53 29MAR87 *** DIAGNOSTIC SEQUENCE INITIATED
17:07:10 29MAR87 OCMS_I User Abort, Sequence Aborted - Isolation in Doubt
17:07:13 29MAR87 *** DIAGNOSTIC SEQUENCE ABORTED
17:13:26 29MAR87 *** DIAGNOSTIC SEQUENCE INITIATED
17:14:00 29MAR87 OCMS_I FAULT SYMPTOM CODE = 0C01 0711 0000
17:14:01 29MAR87 OCMS_I Diagnostic Terminated with Error(s)
17:14:08 29MAR87 *** DIAGNOSTIC SEQUENCE ABORTED
```

Running OCMS Tests

The on-chip maintenance system (OCMS) tests is a subset of mainframe diagnostics and board level diagnostics. The OCMS tests verify the mainframe paks that contain the high density chip arrays.

There are two types of tests: chip identifier signature analysis and interconnect. The tests are nonfunctional--you can execute them without having other paks in the card cage.

If the FRU callout is more than two paks and the error message indicates the isolation is from running the OCMS interconnect test, you can use a special procedure to execute the interconnect test again to further isolate the called out paks to one pak.

How to Execute the OCMS Tests

1. Ensure that NOS/VE is terminated.

2. If you are starting from the console main menu, key in the following sequence to display the OCMS standalone diagnostic menu:

M	to select Maintenance
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
D	to select Diagnostics
O	to select OCMS tests

```
OCMS Standalone Diagnostic

Run Diagnostic
Enter Parameters
Analyze Error Log
Pin Status Utility
```

3. When the OCMS standalone Diagnostic menu shown above appears, type **E** to display the parameter options menu.

```
OCMS PARAMETER OPTIONS

Pak Selection
Test Options
Maximum Operands
```

4. Press **P** to display the pak selection menu as shown below.

PAK SELECTION

Pak 1 :	Memory 1	--	YES	Pak 8 :	Master Clock	--	YES
Pak 2 :	Memory 3	--		Pak 9 :	Page Map	--	YES
Pak 3 :	Memory 0	--	YES	Pak 10 :	PP 00 - 04	--	YES
Pak 4 :	Memory 2	--		Pak 11 :	PP 20 - 24	--	YES
Pak 5 :	CPU C	--	YES	Pak 12 :	Chan 00 - 05	--	YES
Pak 6 :	CPU B	--	YES	Pak 13 :	Chan 20 - 25	--	YES
Pak 7 :	CPU A	--	YES	Pak 14 :	TPM/MAC	--	YES

Options not installed cannot be selected

The OCMS interconnect test supports the following mainframe pak configurations:

Configuration	Paks
1	1 IOU cluster, 1 MEM pak, 3 CPU paks, and 1 page map pak.
2	1 IOU cluster, 2 MEM paks, 3 CPU paks, and 1 page map pak.
3	1 IOU cluster, 4 MEM paks, 3 CPU paks, and 1 page map pak.
4	2 IOU clusters, 1 MEM pak, 3 CPU paks, and 1 page map pak.
5	2 IOU clusters, 2 MEM paks, 3 CPU paks, and 1 page map pak.
6	2 IOU clusters, 4 MEM paks, 3 CPU paks, and 1 page map pak.
7	Only 1 PP, channel, memory, CPU A, CPU B, CPU C, or page map pak selected at a time.

The Pak Selection menu shown above is an example that reflects pak configuration 5.

5. Select one of the seven pak configurations that is less than the installed hardware configuration.

6. Press <F3> to save the contents and return to the OCMS Parameter Options menu.

7. Press **T** to select Test Options. The following Parameter Selection menu appears:

PARAMETER SELECTION	
SET	-- Stop on Error
SET	-- Log Errors
SET	-- Running Display
SET	-- Error Display
CLEAR	-- Do Id/Signature Analysis Test
SET	-- Do Interconnect Test

8. If you want to execute the interconnect test only, set *Do Id/Signature Analysis Test* to *CLEAR*. If you want to execute all tests, press <F10> to set all parameters.

9. Press <Esc> to exit.

10. Press **M** to display the Maximum Operands. The default value is 15. If you want to change the operand value to speed up the test, enter a value between 4 and 15 and press <Return> to save and exit.

11. Press <Esc> and then **R** to execute the OCMS tests.

Special Isolation Procedure

If the OCMS interconnect test calls out more than two paks as replaceable units, follow the special procedure below to reexecute the interconnect test. For example, the following procedure assumes that the OCMS interconnect test calls out three memory paks. Apply the same logic principle when the callout is greater than three paks.

1. Remove called out memory paks 2 and 3 according to section 3 module, Procedure 1 - Logic Paks.

2. Check the pins at the ends of both paks. All the pins at the connector should be straight and not touch other pins. If a pin is bent or misaligned, straighten it. Bent pins may cause the problem.

3. Run the interconnect test. Record the result of the test that is run on memory pak 1.

4. Remove memory pak 1 and check its pins at the connector. If a pin is bent or misaligned, straighten it.

5. Reinsert memory pak 2 that you removed in step 1 in its slot.

6. Run the interconnect test on memory pak 2. Record the result of the test.

7. Remove memory pak 2 and insert memory pak 3 in its slot.

8. Run the interconnect test on memory pak 3. Record the result of the test.

9. Isolate the faulty pak according to the following table.

Test Result of Memory Pak 1	Test Result of Memory Pak 2	Test Result of Memory Pak 3	Maintenance Action
Passed	Passed	Passed	Rerun the OCMS tests with all memory paks.
Failed	Passed	Passed	Replace memory pak 1.
Passed	Failed	Passed	Replace memory pak 2.
Passed	Passed	Failed	Replace memory pak 3.
Failed	Failed	Passed	Replace successively memory paks 1 and 2.
Failed	Passed	Failed	Replace successively memory paks 1 and 3.
Passed	Failed	Failed	Replace successively memory paks 2 and 3.
Failed	Failed	Failed	Backpanel is the problem. Replace the card cage.

Responding to Problems without System Messages

If the system is down and no error message from the system console is displayed, execute the error analysis utility and the offline mainframe diagnostics.

Error Analysis Utilities

There are two error analysis utilities: analyze last error and analyze console logs.

When you execute Analyze Last Error, you invoke a program that examines the latest fault data recorded in the console error logs and isolates the detected error to a FRU or a list of FRU callouts.

The fault data being analyzed can be in the mainframe fault status registers, or from the latest creation date of files that contain the maintenance registers. Such files usually are errors logged by Dedicated Fault Tolerance (DFT) software or previously saved directly from the hardware by the console.

When you execute the Analyze Console Logs, you can select one of the files mention above or the diagnostic log for pak callout.

For fault isolation right after you execute mainframe diagnostics, run the Diagnostic Log Analysis from the Analysis Console Logs for pak callout.

How to Execute the Diagnostic Log Analysis Utility

Type in the following sequence from the Console Main menu to select the Diagnostic Log Analysis:

M	to select Maintenance
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
A	to select Analyze Console Logs
D	to select Diagnostic Log Analysis

Type G for a graphical pak callout of diagnostic failures, or type C for chip and pin isolation.

Run Mainframe Diagnostics

Mainframe Diagnostics invokes an extensive set of offline diagnostics that detect hardware failures in the mainframe elements. Mainframe Diagnostics also verifies the system disk that contains the Maintenance Software Library and the permanent files of the operating system. If the diagnostics detect an unrecoverable error, the console displays a list of FRU callouts and the appropriate fault symptom code.

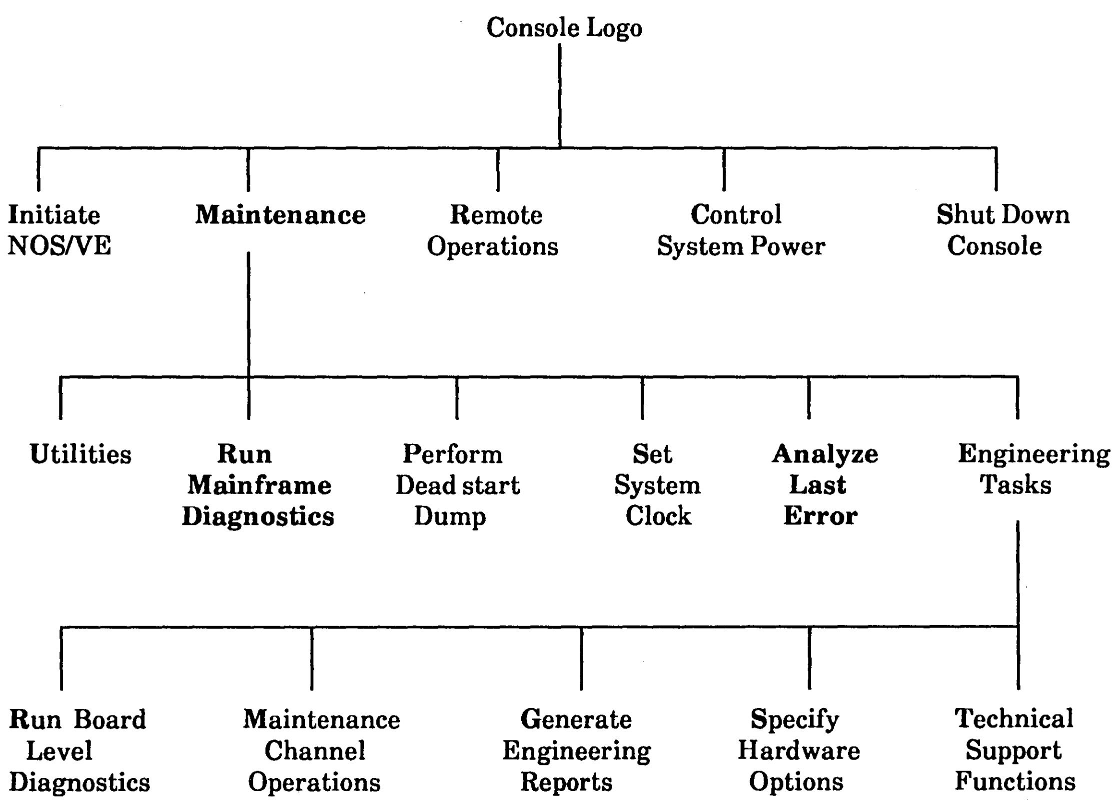
How to Execute Mainframe Diagnostics

1. Power the console on, if not already on.

2. Type **M** to select Maintenance from the main menu.

3. Type **R** to run the mainframe diagnostics. This diagnostic takes an hour to complete. Before the site visit if possible, execute the diagnostics through remote access or with help from the operator.

Console Menu Tree



Disk Deadstart Troubleshooting

When initiation (deadstart) of NOS/VE fails because of system disk problems, you must troubleshoot the disk subsystem to the level of the field replaceable unit.

If Deadstart Fails

The following is a suggested course of action when deadstart fails in such a way that no NOS/VE or monitor display driver prompts are displayed; that is, use this course of action when the console prompts that describe hardware and microcode initialization are displayed but the screen remains blank after switching to NOS/VE.

The procedure is specifically for a failure to access the system device that in turn prevents a deadstart. With minor modifications to the parameters, however, this procedure also applies during system installation when other disks in the configuration fail.

There are three parts to this procedure:

1. Performing a series of quick checks to ensure that failure has no trivial cause;
2. Running the offline disk diagnostic resident in the console and checking the failure status from the contents of the P and A registers;
3. Isolating the failure based on the failure status from the contents of the P and A registers.

Part 1: Do a Series of Quick Checks

1. Identify the device configuration of the CYBER initialization package (CIP) on the cable configuration map. Make sure that the configuration is identical to the CIP device configuration on the Configure Critical Devices menu.

   To view the cable configuration map, open the front door of the mainframe. The cable configuration map is in the literature holder of the front door. To view the CIP device configuration on the Configure Critical Devices menu, use the following key sequence:

<Alt F2>	to exit NOS/VE and return to console mode
<Esc>	Press until the Main menu appears
U	to display the Utilities menu
C	to display the Configure Critical Devices menu

   The contents of the CIP location line are usually:

CH	EQ	UN	DEVICE TYPE
01	00	00	FSD

   If the correct device is not shown, edit the entry. Press <F3> to save the contents and retry the deadstart. If the correct device is shown, make a note of its number for later use.

2. Find the physical location of the control module used to access the CIP device specified by the equipment (EQ) number on the CIP location line.

   Open the front door of the cabinet to check the two-digit maintenance display on the front left of the control module.

   - If the display shows 00, no CM fault exists. Proceed with step 3.

   - If the display is blank, the problem is in the input power. Refer to the module, Isolating a Power Problem in a Peripheral Cabinet.

   - If the display is other than 00, the problem is in the control module. Remove the rear door of the cabinet to access the CM on/off switch at the back of the CM. Turn CM power off and on to initiate the CM diagnostics.

     If the display stops changing and ends at 00 after diagnostics finish, retry deadstart. If an error display reappears, refer to the module, Interpreting a Control Module Error Code, to isolate the field replaceable unit.

3. Identify the system disk that contains NOS/VE. This disk's unit number (UN) is shown in the CIP location line of the Configure Critical Devices menu. This disk unit is connected to the control module identified in step 2 above. To determine the disk address, open the front door of the cabinet and check the number of the logic plug (top button shown on the figure opposite) on the front panel of the disk.

   Check that the indicator in the fault clear switch is not lit and that the disk is spun up. The green ready indicator in the start switch is lit, but not flashing. The maintenance display behind the air filter should read 00. If the foregoing are true, proceed to step 4.

   However, if the maintenance display shows 03 or 02, or the indicator in the start switch is not lit, the disk is spun down. Check that the start switch is in the down position. If not, press it. If the disk spins up (see above), retry deadstart. If the disk still fails to spin up within one minute, proceed to part 2.

   If the indicator in the fault clear switch is lit, record the value shown on the maintenance display for the installation report. Press the fault clear switch and check that its indicator is not lit. Check that the maintenance display returns to 00. If it does not, press the start switch to spin down the disk.

   You should wait until the indicator in the start switch stops flashing. Then press the start switch to spin the disk back up. If the disk spins up (see above), retry the deadstart. If the indicator in the fault clear switch lights, refer to the trouble analysis section of the Fixed Storage Drive Hardware Maintenance Manual [Control Data publication 83325610].

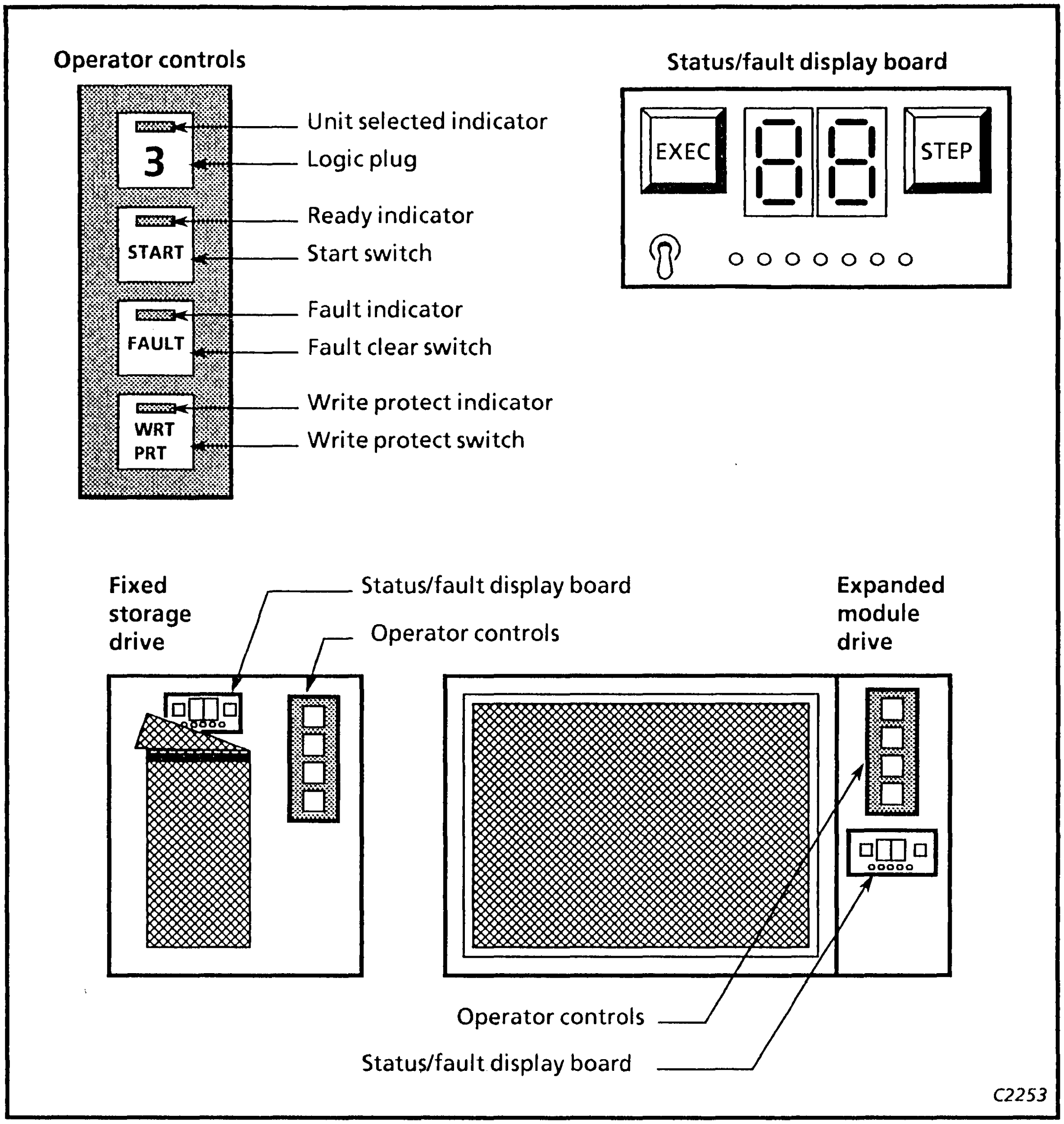
4. Check that the unit-selected indicator on the logic plug is flashing (it flashes very dimly) at one- or two-second intervals. The flashing rate should be close to that of the other disks in the cabinet. If so, proceed to step 5 below.

   If the indicator is not flashing, or if the flashing rate seems to be about half the rate of other disks in the cabinet, check all disk cables. Make sure the retention screws are fully mated and secure. If there is no change, proceed to part 2.

5. While watching the system disk indicator, repeat the deadstart. If the flashing of the indicator changes, the contents of the disk may have been corrupted.

   If this happens during system installation, confirm the correct disk operation procedure before attempting reinstallation from tape.

Disk Control Panel



Part 2: Run Disk Diagnostic

You can test the disk from the console. Key in the following sequence to select the test:

<Alt F2>	to exit NOS/VE, if necessary, and return to console Main menu
M	to select Maintenance
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
D	to select Diagnostics
S	to select Subsystem Tests
D	to select Disk Test

Check the entries for the parameters and the deadstart peripheral processor. They should be identical to the contents of the CIP location line in the critical devices configuration table. Correct entries as follows:

Enter **E** to select the Enter Parameters menu
Enter the channel number address in word 0
Enter the equipment number (control module address) in word 1
Enter the unit number (disk address) in word 2
Press <F3> to save
Enter **S** to select the deadstart peripheral processor
Enter **00** if the channel number is in the range 01 through 05,
20 if the channel number is in the range 20 through 25

Ensure that the deadstart PP number and the parameter entries are correct. Return to the Disk Test menu and enter **R** to execute the disk test. The test execution time is less than two minutes.

A **Test Completed** message means that the channel, control module, and disk are operating correctly and you should reinitiate NOS/VE. If retry is unsuccessful, you should investigate a cause other than hardware failure. For example, NOS/VE files may be corrupted on disk.

If the test fails and the displays of the P and A registers on the console stop cycling, follow these steps:

1. Record the contents of the P and A registers that are displayed.

2. Use the contents of the P and A registers as an index to part 3 for isolation of the field replaceable unit.

If you want more information on the interpretation of the content of the error code, press <Shift F1> to access the help display when you are back at the Subsystem Test Selection menu.

The error information is also contained in the PP memory locations 5000 through 5057. If you want to include the content of the PP memory with your maintenance activity form, take a peripheral processor memory dump of the deadstart peripheral processor according to the procedure below. Make sure you record or print the contents of the peripheral processor memory.

Take a peripheral processor memory dump as follows:

<Alt F10>, **Y**	to enable maintenance mode
<Alt F9>	to access the Global Functions menu
D	to select the PP Memory Dump utility

```
PP MEMORY DUMP UTILITY

PP Number To Dump    00
Start Address        5000
Dump Type            Hex
Dump To Screen       Yes
Dump To File         None
Dump To Printer      Yes
Start Dump
```

Configure the dump window as follows:

PP Number to Dump	Equals that of deadstart PP
Start Address	5000
Dump Type	Hex
Dump to Screen	Yes
Dump to File	As desired. Enter the name of the file: remember to include **a:** in front of a filename if the file resides on a floppy.
Dump to Printer	As desired

Enter **D** to start the Dump.

When the maintenance activity is complete, press <Alt F10>, **N** to disable maintenance mode before you return the system to the customer.

Part 3: Isolate the FRU

The contents of the P and A registers indicate the disk operation when the error occurred. Except for the following four status cases that are significant during system installation and require special attention, refer to the Disk Deadstart Troubleshooting Table on the last page of this module for suggested maintenance action.

Case A: **P = 030010** **A = 401021**

Dump Address

5022 = 0001
5023 = 0011
5024 = 0063
5033 = 0000
5034 = 0000
5035 = 0000

or

P = 024001 **A = 51534?**

P = 030010 **A = 401017**

Case A indicates a problem in the connection between the mainframe and the control module. Check that all cables connected to the failing channel are undamaged and that retention screws are tight. Rerun the disk test. If it still fails then:

1. Successively change the test configuration to that of the other control modules (CMs) on the same channel and rerun the disk test each time. Note which CMs fail with Case A status.

2. Determine the order in which the CMs are cabled. Identify the CM that fails with Case A status and that is cabled closest to the mainframe.

3. Disconnect the remaining CMs connected to the same channel and rerun the disk test configured to the CM identified in 2 above.

4. If the disk test still fails, replace successively the cable to the CM identified in step 2, the control module, and the channel pak.

5. If the test passes, reconnect the next CM only, and rerun the disk test. If it fails, discard the cable to the last CM and replace it with a spare cable. If it passes, reconnect the next CM only.

   Continue in this way until you replace the failing cable and all CMs on that channel pass the disk test or fail it with other than Case A status.

6. If all CMs pass the test, reinitiate NOS/VE. If all CMs do not pass the test, replace successively the channel-to-bulkhead IPI cable and the channel pak.

Case B: P = 024001 A = 51634?

Dump Address

5022 = 000E
5023 = 00E?
5036 = CM or Disk address
5037 = 1010
5040 = ??24
5041 = C000
or 8000
or 4000
or 3000
or 1000

Case B indicates a problem in the connection between the CM and the disk. Ensure that the parameter entries are correct. Check that all cables that connect the CM in the test configuration to its disks are undamaged. Make sure their retention screws are tight. Rerun the disk test. If it still fails, follow these steps:

1. Successively change the test configuration to that of the other disks connected to the same CM. Rerun the disk test, noting which disks fail with Case B status.

2. Determine the order in which the disks are cabled. Identify the disk that fails with Case B status and that is cabled closest to the CM.

3. Disconnect the remaining disks connected to the control module and rerun the disk test configured to the disk identified in step 2 above.

4. If the disk test still fails, replace the cable to the disk identified in step 2. If the test passes, reconnect the next disk only and rerun the disk test. If it fails, discard the cable to the last disk and replace it with a spare. If it passes, reconnect the next disk only.

   Continue in this way until the failing cable is replaced and all disks connected to that CM pass the disk test or fail it with other than Case B status.

   If all disks pass the test, retry a NOS/VE deadstart. If not, repeat the procedure in Part 2.

Case C: P = 024001 A = 410340

Dump Address	**5022 = 0008**
	5023 = 00E?
	5036 = CM or Disk address
	5037 = 4010
	5040 = ??26
	5041 = 001?

Case C indicates that the disk driver is attempting to write to a write-protected disk. Press the write protect switch on the disk control panel to remove the write protect. Reinitiate NOS/VE.

Case D: P = 02020? A = ?????? Dump Address 5032 non-zero

Case D indicates that the intelligent peripheral interface channel in the mainframe detects that data has been lost or a parity error has occurred. Run IOU diagnostics to check the channel operation before reinitiate NOS/VE. To run the IOU diagnostics, press <Esc> until the display returns to the Diagnostics main menu. Type I to select the IOU diagnostics menu, and type **R** to run the diagnostics.

Case E: P = 024101 A = 516340

Case E indicates a communication or connection problem between the channel and the disk drive. Perform the following procedure:

1. Change the test configuration to that of the other disk connected to the same channel. Rerun the disk test.
2. If the same error code is displayed, physically change the IPI cable to another IPI channel and rerun the disk test for the disk drives.
3. If the test passes, the original channel interface is bad. Successively replace the channel-to-bulkhead cable and the channel pak.
4. If the test still fails with the same error code, follow the steps for case B.

Disk Deadstart Troubleshooting Table (Sheet 1 of 2)

P and A Registers	Error Status or Operation When Error Occurred	Maintenance Actions
P=0????? A=?02???	Select controller	Successively perform items 3, 2, 1, and 5 from the action list on the next page.
P=0????? A=5??352	Drive not ready and operational	Ready the drive. Ensure that power is available and ready indicator is lit.

Disk Deadstart Troubleshooting Table (Sheet 2 of 2)

P and A Registers	Error Status or Operation When Error Occurred	Maintenance Actions
P=0????? A=5??353	CM3 not ready and operational	Ready the controller.
P=0????? A=50?361	Invalid controller address	Recheck parameter entry and cable connections.
P = 0????? A = 50?362	Invalid drive address	Recheck parameter entry and cable connections.
P = 024??? A = 407???	Seek-read data	Perform the read check according to the procedure in the disk drive maintenance manual. Successively perform items 3, 4, 2, and 5 from the action list below.
P = 024??? A = 41034?	Seek-write data	Perform the write check according to the procedure in the disk drive maintenance manual. Successively perform items 3, 4, 2, and 5 from the action list below.
P = 03020? A = 41112?	Read from controller buffer	Successively perform items 3, 2, 1, and 5 from action list below.
P = 0????? A = 412???	Write to controller buffer	Successively perform items 3, 2, 1, and 5 from action list below.

Action List

1. Check/replace bulkhead-to-control module cable connection.
2. Replace the channel pak.
3. Check CM two-digit error display. If 00 is not displayed, refer to the module, Interpreting a Control Module Error Code. If the display is blank, refer to the module, Isolating a Power Problem in a Peripheral Cabinet.
4. Check/replace CM-to-FSD cable.
5. Notify next level of support. Check/replace channel-to-bulkhead cable.

Tape Deadstart Troubleshooting

The 930 system uses either the streaming tape unit (STU) or the integrated-peripheral-interface (IPI) tape unit as a deadstart device. The following troubleshooting information is for the STU. For troubleshooting information on the IPI tape unit, refer to appendix B in this book.

When deadstart from the STU fails during a tape operation such as an update, an installation of Maintenance Software Library (MSL), or a CYBER initialization package (CIP) operation, use the following steps and refer to the Tape Deadstart Troubleshooting Tables to isolate the fault.

1. Check the operator panel of the STU.

   If the fault code contains an error code, refer to the trouble analysis section of the STU Maintenance manual. If the fault code is blank, perform the next step.

2. Run STU operator test 01 on scratch tape. If you need a procedure, refer to the table of contents at the beginning of this section.

   If the termination code is not 00, refer to troubleshooting analysis section of the STU Maintenance manual. If the termination code is 00, perform the next step.

3. Retry execution of the MSL update or install MSL operation.

   If an error message appears, refer to section 5 module, Interpreting CTI Error Messages, for maintenance action. If maintenance action is unsuccessful, perform the next step.

4. Recheck entries of channel, equipment, and unit numbers for the tape subsystem used as the installation device. If the previous entries are wrong, correct them and retry the operation. If retry fails, perform the next step.

5. Select Tape Tests by entering this sequence from the Console Main menu:

M	to select Maintenance.
E	to select Engineering Tasks.
T	to select Technical Support Functions.
<Return>	to proceed.
D	to select Diagnostics .
S	to select Subsystem Tests.
T	to select Tape Test.

6. Press E to enter or check the parameters words 0 through 2. The figure opposite shows what to enter in parameter words 0 through 2.

Entering Tape Test Parameters

SST Diagnostic Parameters (OCTAL)

Parameter word	Value	Value
00	X000CC	0000EE
02	0000UU	
04		
06		
08		
10		
12		
14		

Parameter word 1:
EE is equipment number in octal.

Parameter word 0:
If the most significant bit (X) is 0, select the CIP tape tests. If X is 1, select the scratch tape tests. CC is the channel number in octal.

Parameter word 2:
UU is the unit number of the tape drive.

NOTE

Only a system installed with CIP L716 or later version can execute either the CIP tape tests or scratch tape tests. Usually you execute the CIP tape tests to load the tape adapter microcode before executing the scratch tape tests. If you execute the scratch tape tests without the microcode in the tape adapter, the test fails. A system installed with CIP L703 or earlier version can execute only the CIP tape tests.

7. Press <F3> to save the content of the parameters.

8. Press **R** to display the instructions to proceed with the test execution.

9. Mount a CIP tape with adapter microcode or a scratch tape to the designated tape drive and ready the drive.

   The test execution time is less than one minute. When an error occurs, a **Test Failed-Terminated** message displays and the P and A registers display stops cycling.

10. Use the test results of the contents of the P and A registers displayed on the console as an index to one of the following Deadstart Troubleshooting Tables to perform the next maintenance action.

    If the 930 system is installed with CIP L703 or an earlier version, use the CIP L703 Deadstart Troubleshooting Table. If the 930 system is installed with CIP L716 or a later version, use the CIP L716 Deadstart Troubleshooting Table.

CIP L703 Deadstart Troubleshooting Table

P Register	A Register	Maintenance Action
P=000006	A=000000	No error detected. If retry fails, escalate to the next level of support.
P=000004 or P=000005	A=000000	No response from tape subsystem. Check all tape cable connections. Successively replace ISMT adapter and STU interface board.
	A=000001 through 000007	Channel error. Successively replace the channel pak and ISMT adapter.
	A=001XXX or 002XXX	Read or write error. XXX specifies the error code. Refer to table 9 in the module, Using the SAM Table, for the next action.
	A=007001	Data error. Successively replace the ISMT adapter and channel pak. Then request the next level of support to check or replace the channel-to-adapter cable and adapter-to-bulkhead cable.
P=000005	A=005XXX	Adapter error. XXX specifies the error code. Refer to table 9 in the module, Using the SAM Table, for the next action.

CIP L716 Tape Deadstart Troubleshooting Table

P Register	A Register	Maintenance Action
P=000006	A=000000	No error detected. If retry fails, escalate to the next level of support.
P=000004 or P=000005	A=000000	No response from tape subsystem. Check all tape cable connections. Successively replace ISMT adapter and STU interface board.
	A=000001 through 000007	Channel error. Successively replace the channel pak and ISMT adapter.
	A=000010	Ready the tape drive.
	A=000011	Insert write ring to the scratch tape.
	A=002000 or 004000 or 005000	Data mismatch error. Successively replace the ISMT adapter and channel pak. Then request the next level of support to check or replace the channel-to-adapter cable and adapter-to-bulkhead cable.
	A=0020XX through 0050XX	Status word 3 error codes. XX specifies the error code. Refer to Status Word 3 Error Codes table on the next page for the next action.
P=000005	A=001XXX	Adapter error. XXX specifies the error code. Refer to table 9 in the module, Using the SAM Table, for the next action.

Status Word 3 Error Codes (Sheet 1 of 2)

Error Code (octal)	**Description/Maintenance Action**
01	Connect rejected because tape unit is off line, powered off, or does not have cables to adapter.
04	Function rejected because tape unit not ready.
05	Tape unit declared not ready during last operation because of unit check status or an interrupt.
06	Write not executed because write ring missing.
07	Tape unit incapable of reading the density of the tape.
10	Over 7.6 m (25 ft) of blank tape in phase-encoded (PE) mode or 4.6 m (15 ft) in group-coded recording (GCR) mode.
12	Unable to write from loadpoint because of bad tape (identification burst not detected immediately after being written). Use a different reel of tape.
16	Unable to properly set tape unit automatic gain control (AGC) on this tape in GCR mode. Clean tape unit and retry function.
30	Backward motion attempted at loadpoint.
31	Tape units 4 through 17 requested (only numbers 0 through 3 supported).
32	Tape unit busy rewinding or doing a data security erase. Wait until unit is not busy.
33	Reverse read attempted in GCR mode.

Status Word 3 Error Codes (Sheet 2 of 2)

Error Code (octal)	Description / Maintenance Action
34	A controlled backspace function was attempted when the previous operation was not a write.
41	Tape unit failed to reach operating speed.
50	Function code not recognized.
51	Tape unit not connected.
52	Function parameters not sent.
55	Channel parity error during function or parameter transmission.
61	Data not received in time for a peripheral processor (PP) output operation.
62	Peripheral processor not ready to received data for a PP input operation.
70	The tape subsystem detected a catastrophic failure during operation or while running internal diagnostics.

Use the status indicators on the monitor and control module (MCM) and the switches and indicators on the AC distribution rack for troubleshooting power failures caused by an environmental problem or a faulty power assembly.

Troubleshooting Prerequisite

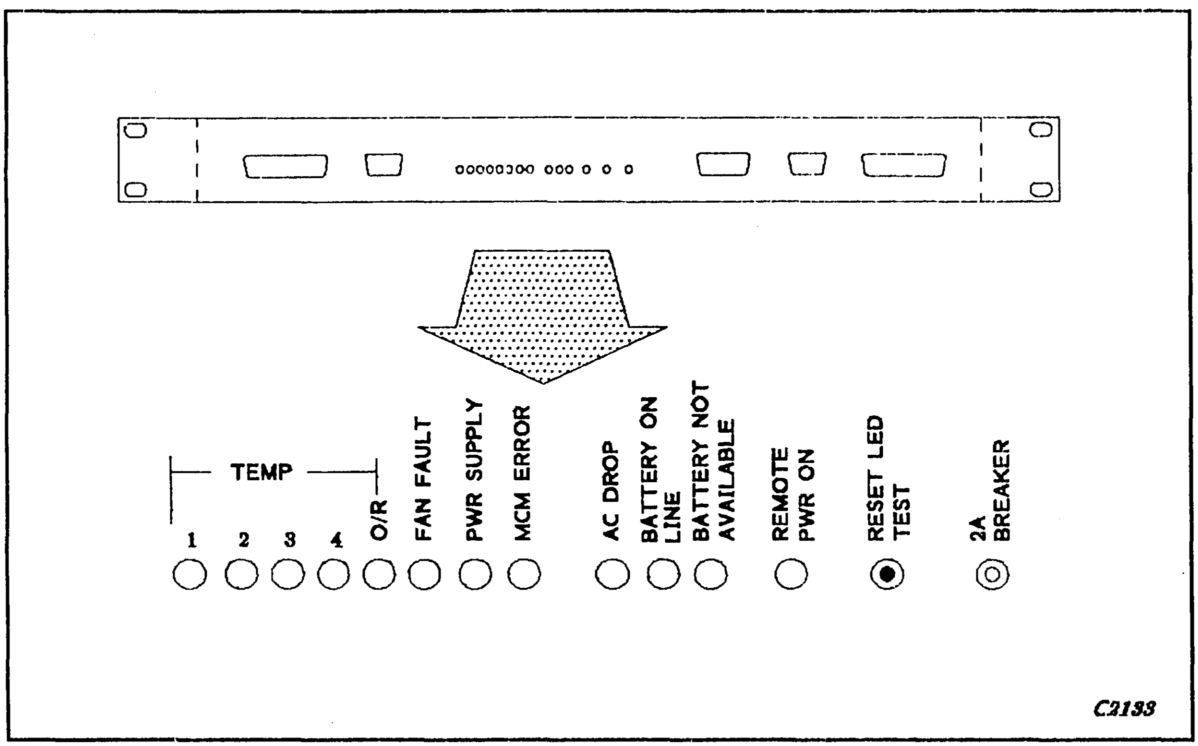
Before referring to subsequent modules for troubleshooting procedures, read about the functions of the switches and indicators on the monitor and control module and the AC distribution rack on the next three pages and in the Safe Use and Operation of the CYBER 930 [Control Data publication 60469007].

Monitor and Control Module

The monitor and control module is at the top rear of the mainframe. Remove the rear cabinet door to view the status indicators shown below.

Except for the green indicator, Remote Power On, all other indicators should not light during normal operation.

Monitor and Control Module - Status Indicators

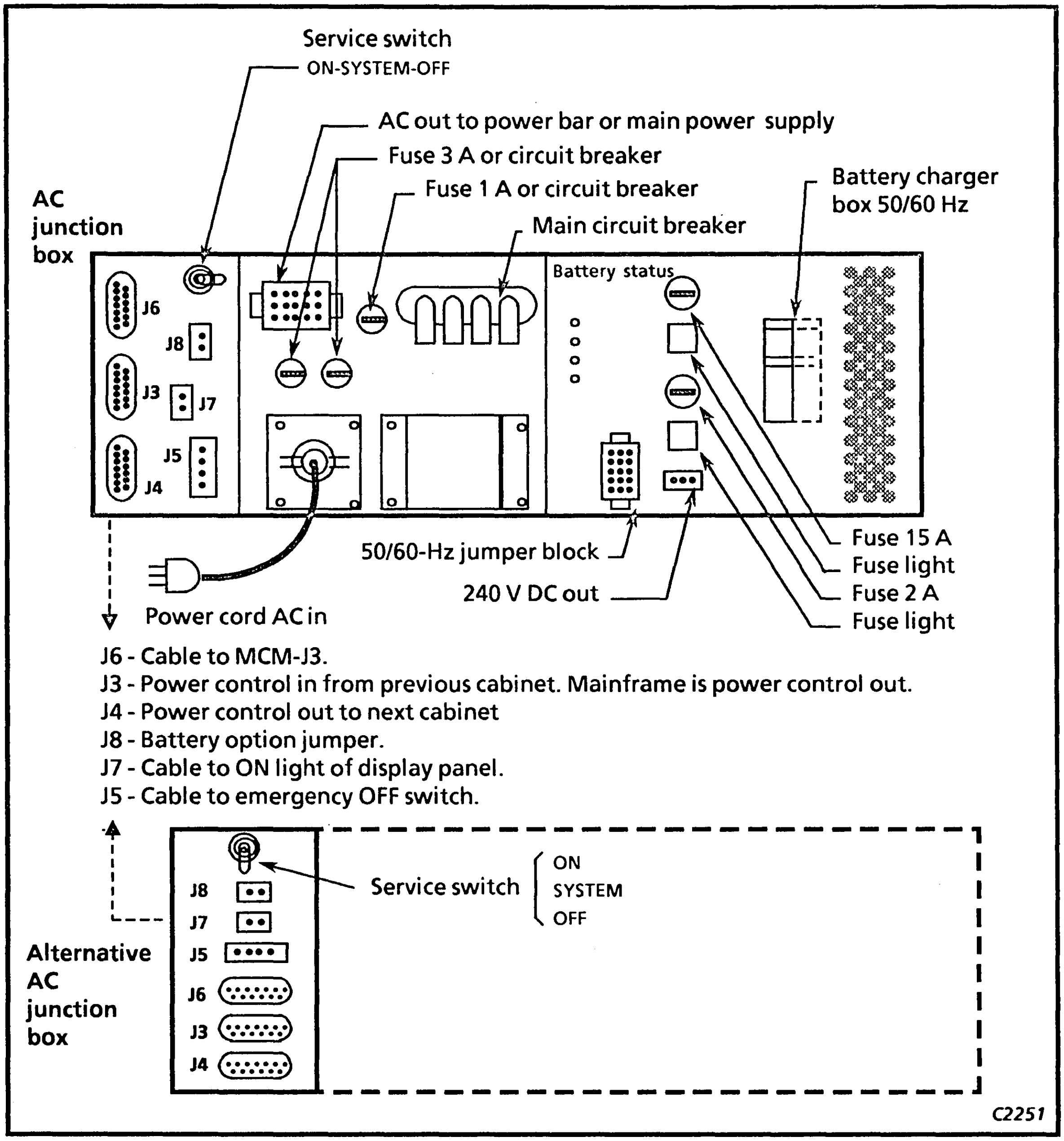


LED Indicator	Meaning of an Indicator That Is Lit
TEMP 1, 2, 3, 4	If one or more indicators light, the temperature sensor(s) detect an ambient temperature inside the cabinet greater than 45° C (113° F). If the indicator flashes, the temperature is greater than 55° C (131° F)
TEMP O/R	Temperature sensor(s) itself is out of normal operating range.
FAN FAULT	A fault is in the fan assembly.
PWR SUPPLY	A fault is in the power supply module.
MCM ERROR	A fault is in the the monitor and control module.
AC DROP	AC input power is below the operating limit in the mainframe.
BATTERY ON LINE	Battery backup unit in the mainframe or the peripheral cabinet is the only source of input power to the cabinet(s).
BATTERY NOT AVAILABLE	Status of the battery backup unit. Indicates a fault from a battery backup unit either in the mainframe or the peripheral cabinet. Refer to the battery status indicators on subsequent pages for details. If the battery power is too low, this indicator also lights. It goes off when the battery is recharged.
REMOTE PWR ON	When lit, shows that the power is turned on from the system console. The service switch has no effect on this indicator.
RESET LED TEST	When you press, this button, it resets the MCM and the indicators if the fault condition has been corrected. When you press and hold this button, all indicators should light.
2A BREAKER	The AC 2-A thermal breaker protects the MCM. If overcurrent condition occurs, the shaft of the breaker pops to the outward position. Press it back to reset the MCM.

AC Distribution Rack

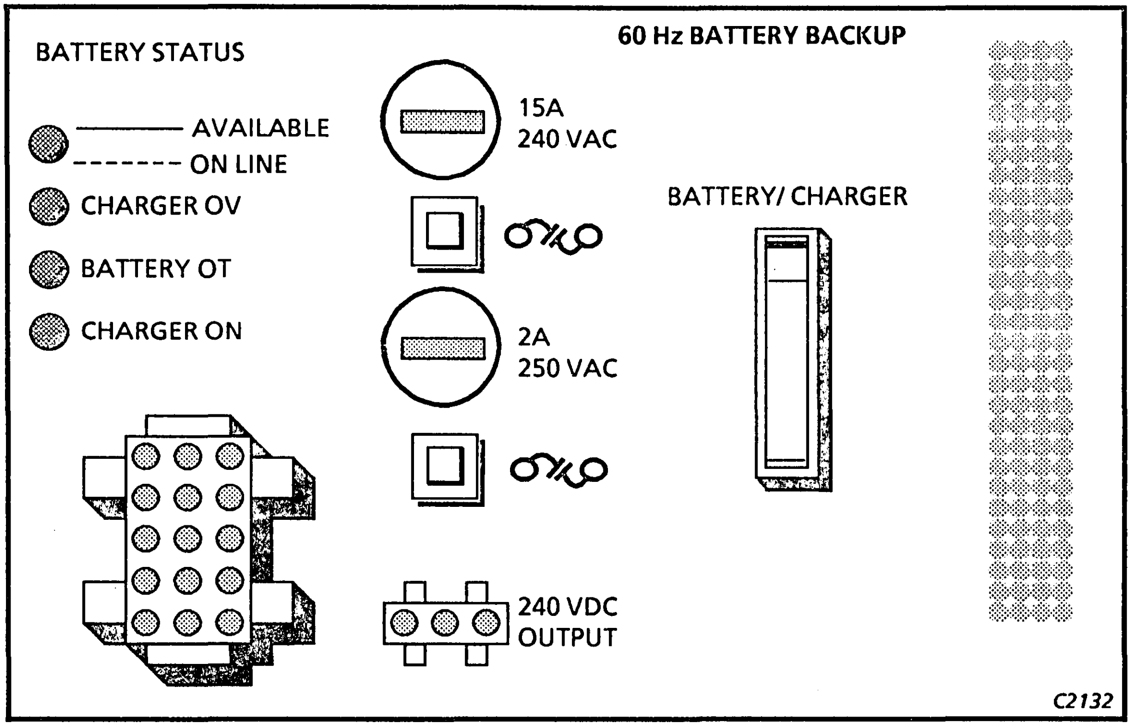
The AC distribution rack is at the bottom rear of the mainframe. To view the front panel of the AC distribution rack shown below, remove the rear door of the cabinet. Peripheral cabinets that contain fixed storage drives have the AC distribution rack in the same position as in the mainframe cabinet.

Front Panel of AC Distribution Rack



The battery backup option is either in the AC distribution rack of the mainframe or in the peripheral cabinet equipped with the AC distribution rack. In cabinets without the battery backup option, the slots for the battery charger box and the battery assembly are empty. The battery assembly is at the rear of the AC distribution rack. You can access the battery assembly from the front of the cabinet.

Battery Status Indicators



Indicator	Meaning When Lit
—— AVAILABLE ----- ON LINE	Battery power is available. If flashing, indicates battery is the sole supply of power to the cabinet.
CHARGER OV	An overvoltage condition exists in the battery charger box.
BATTERY OT	An over-temperature condition exists in the battery charger box.
CHARGER ON	Battery charger is recharging the batteries.
Fuse Light	This light is on when cabinet power is available. If the light is off, the fuse has blown.

Power Operation Failing

Troubleshooting procedures use the structured analysis method. If you are unfamiliar with this format, refer to the module, Interpreting the SAM Table, in this section.

Power operation failure can occur in one of two ways:

- System does not power on from the console.
- System powers on but shuts down with a fatal error.

System Does not Power on from the Console

You may repeat more than one troubleshooting procedure to isolate multiple power problems that prevent the console from powering the system on or off. If you cannot power the system on from the console, the console usually displays a **Power Operation Failed** message.

(Start)
↓

010	Y	N						Is AC power connected to the system?
020		1						Verify voltage is correct and plug the power cable in.
030		2						Close breaker and retry.
040	Y	N						Is the voltage correct and the breaker on?
050		1						Correct voltage input and/or turn on the breaker. Then retry.
060	N	Y						When you press <F10>, does the green REMOTE PWR ON on the MCM light?
070		N	Y					Is the service switch set to the system position?
080			N	Y				Is the cable from the MCM J4 connected to the 37 pin D-subminiature connector of the main power supply?
090				N	Y			Remove the cable from J4. Are 5 V between pins 1 and 4 on J4 of the MCM? Replace the cable after testing.
100					N	Y		Does the main relay in the AC distribution rack close?
110						N	Y	Is AC power connected to the main power supply?
120							1	Replace the main power supply.
130						1		Connect and retry.
	(A	B	C	D	E)			

(A B C D E)

140 1 Check continuity of the cable. If there is no continuity, replace the cable.

150 2 Replace the MCM.

160 3 Replace the AC distribution rack.

170 4 Escalate to the next level of support.

180 1 Replace the MCM.

190 1 Connect and retry.

200 1 Set the service switch to SYSTEM and retry.

210 N Y Does the system power on from the service switch?

220 N Y Is the cable from the console to the mainframe correctly oriented?

230 N Y Use a scope to check pin 5 of the cable going to J5 of the MCM. Is the console outputting a 1-kHz pulse train?

240 1 Replace the MCM.

250 1 Problem is with the console.

260 1 Reorient the cable and retry.

270 N Y When you push the RESET LED TEST button, do all LEDs light?

280 N Y Is cable J4 connected at both ends?

290 N Y Does the main relay close?

300 N Y Is AC power connected to the main power supply?

310 N Y Remove the cable at J4 on the MCM. Are there 5 V between pins 1 and 4 on J4 of the MCM?

320 1 Replace the main power supply.

330 1 Replace the MCM.

340 1 Connect and retry.

(A B C)

(A B C)

350 Y N Check J3 and J4 with a voltmeter. Are there 12 to 18 V on pins 3 and 4?

360 N Y Is the continuity of the cables between J4 of MCM and J6 of the AC junction box broken?

370 1 Replace the MCM.

380 1 Replace the cable and retry.

390 1 Replace the AC distribution rack.

400 1 Connect and retry.

410 N Y Remove the cable from J6 of the AC junction box. Are 12 VAC between pins 12 and 13 on J6 of the AC junction box?

420 Y N Is the cable continuous?

430 1 Replace the cable and retry.

440 1 Replace the MCM.

450 1 Replace the AC distribution rack.

System Powers on but Shuts Down with a Fatal Error

(Start)

↓

010 Y N Was a long or short warning message from NOS/VE displayed?

020 Y N Did a battery backup occur?

030 N Y Did the power drop?

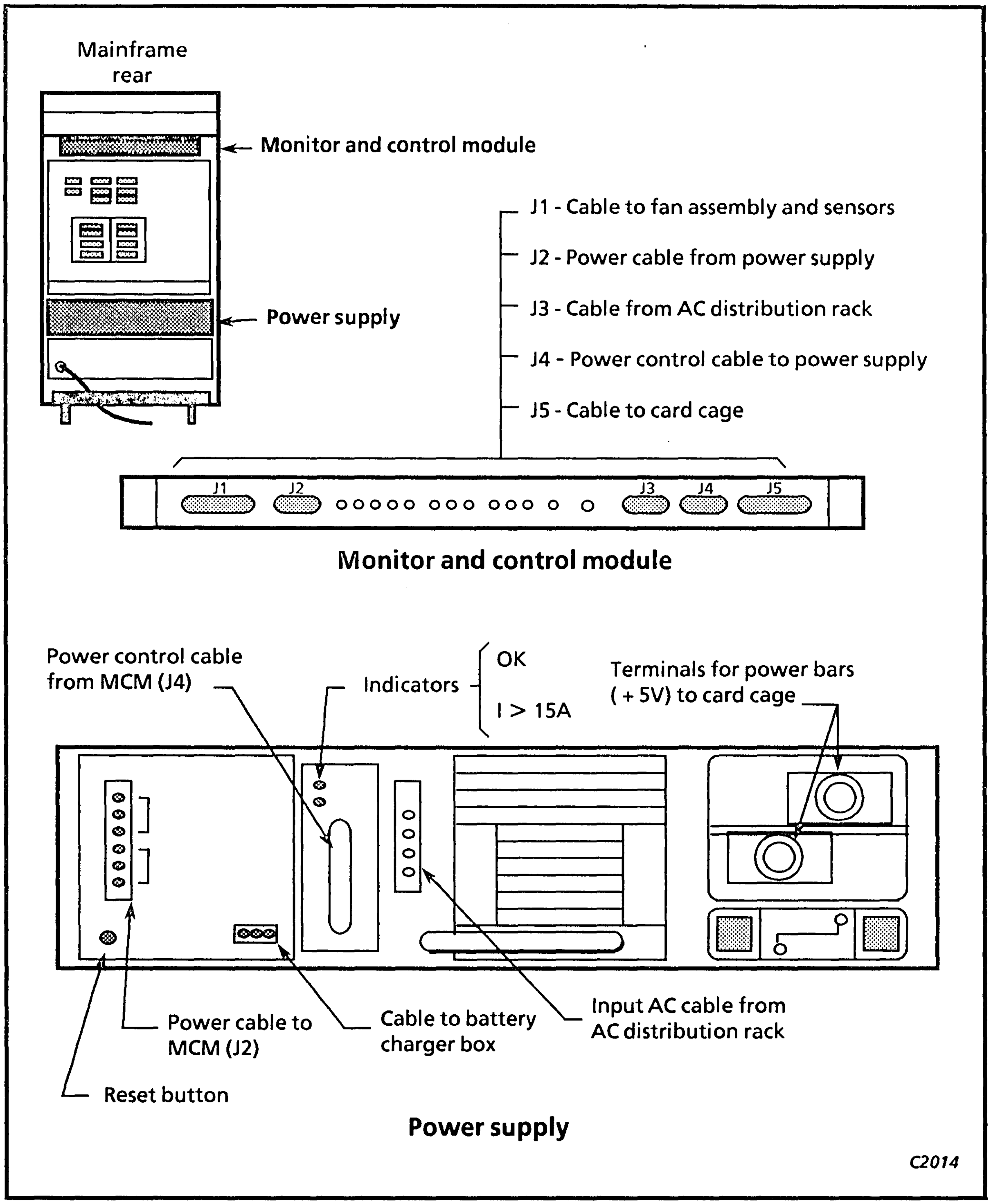
040 1 Retry the system to see if the failure reoccurs.

050 1 Escalate to the next level of support.

060 1 Escalate to the next level of support.

(A)

Power Supply Module and Monitor and Control Module



(A)

070 N Y Are any LED indicators on the MCM lit?

080 N Y Is the TEMP indicator lit?

090 N Y Is the intake or exhaust outlet blocked?

100 1 Remove the blockage and retry.

110 N Y Is the temperature outside specified ranges?

120 1 Keep system shut down until the temperature returns to operating ranges.

130 N Y Press the RESET LED TEST button on the MCM. Is the error clear?

140 1 Power the system on again. If the error repeats, perform the next step.

150 2 Replace the temperature sensor.

160 3 Replace to the MCM.

170 4 Escalate to the next level of support.

180 1 Replace the MCM.

190 2 Replace the temperature sensor.

200 3 Escalate to the next level of support.

210 N Y Is FAN FAULT indicator lit?

220 N Y Is intake or exhaust outlet blocked?

230 1 Remove blockage and retry.

240 N Y Is cable on J1 of the MCM properly connected?

250 N Y Remove the top cover of the mainframe. Are 24 V applied to the fans?

260 N Y Are 5 V applied to the fan performance sensor?

270 1 Replace the fan assembly.

280 1 Replace the MCM.

(A B C D)

(A B C D)

290	N	Y	Are 24 V applied to the fan speed control from pins 22, 23, 24, and 25 of the cable?
300		1	Replace the fan speed control.
310	N	Y	Remove the protective cover of the main power supply. Are 24 V coming from the power supply to the MCM?
320		1	Replace the MCM.
330	1		Replace the main power supply.
340	1		Connect the cable and retry.
350	N	Y	Is PWR SUPPLY indicator set?
360	N	Y	Is the intake or exhaust outlet blocked?
370		1	Remove the blockage and retry.
380	N	Y	Does resetting the MCM clear the error?
390	N	Y	Remove all paks. Then reinsert the paks one at a time (powering up and down each time) to determine which pak is shorted.
400		1	Replace the pak causing the short.
410	N	Y	Are any outputs of the main power supply shorted?
420		1	Clear the short and retry.
430	1		Replace the main power supply.
440	2		Escalate to the next level of support.
450	1		Replace the MCM.
460	2		Escalate to the next level of support.

(A) (B)

	(A	B)				
470		N	Y			Is MCM ERROR lit?
480			N	Y		Does resetting the MCM clear the error?
490				N	Y	Retry the operation. Does the error return?
500					1	Replace the MCM.
510					2	Escalate to the next level of support.
520				1		Return the system to the customer.
530			1			Replace the MCM.
540			2			Escalate to the next level of support.
550	N	Y				Did a battery ridethrough occur?
		1				Restart the system.
560	N	Y				On J5 of the MCM check pins 3, 4, and 5 to see they are at 5 volts.
570		N	Y			On backpanel location 14 of the 930 mainframe or location 15 of the 932 mainframe, make sure that 5 V are at pins D94, D95, and D97.
580			N	Y		Observe that the long or short warning bit is set in the maintenance registers. It is the most significant bit of the environment fault status registers 91 and 92.
590				1		Replace the TPM (4KB0) pak.
600			1			Escalate to the next level of support.
610		N	Y			Is the continuity of the cables between the MCM and the backpanel broken?
620			1			Replace the cable and retry.
630		N	Y			Does the backpanel have shorts?
640			1			Clear the shorts and retry.
650		1				Escalate to the next level of support.
660	1					Replace the MCM.
670	2					Escalate to the next level of support.

Power Status Failing

If the system powers on but displays the non-fatal message, **Power Status is Failing,** one of the following conditions exists:

- Status LED indicator(s) on the MCM is set;
- Cable is loose or faulty;
- Wall clock fails to set;
- BATTERY NOT AVAILABLE indicator is set.

The following troubleshooting procedures use the structured analysis method. If you are unfamiliar with this format, refer to the module, Interpretting the Sam Table.

(Start)
↓

010	N	Y					Are any LED indicators on the MCM lit?
020		N	Y				Is the TEMP O/R indicator lit?
030			N	Y			Is the cable to J1 of MCM connected?
040				N	Y		Does resetting the MCM clear the error?
050					1		Retry.
060				1			Replace the out of range sensor as indicated by indicators TEMP 1 through TEMP 4.
070				2			Replace the MCM.
080				3			Escalate to the next level of support.
090			1				Connect the cable and retry.
100		N	Y				Is the FAN FAULT indicator set?
110			N	Y			Is the intake or exhaust outlet blocked?
120				1			Remove the blockage and retry.
130			N	Y			Is the cable on J1 of the MCM properly connected?
140				N	Y		Remove the top cover of the mainframe. Are 24 V applied to the fans?
150					N	Y	Are 5 V applied to the fan performance sensor?
160						1	Replace the fan assembly.
170					1		Replace the MCM.
	(A	B	C	D)			

	(A	B	C	D)		
180				N	Y	Are 24 V applied to the fan speed control from pins 22, 23, 24, and 25 of the cable?
190					1	Replace the fan speed control.
200				N	Y	Remove the protective cover of the main power supply. Are 24 V coming from the power supply to the MCM?
210					1	Replace the MCM.
220				1		Replace the main power supply.
230			1			Connect the cable and retry.
240	N	Y				Check J5 pin 5 of the MCM. Is it at 5 volts ?
250		N	Y			Is pin D97 of 930 backpanel location 14 or 932 backpanel location 15 at 5 V?
260			N	Y		Is J5 pin 10 of MCM at 12 V?
270				N	Y	Is the cable between the mainframe and console connected?
280					1	Reboot the console and try again.
290					2	Try a new console.
300				1		Escalate to next level of support.
310			N	Y		Does resetting the MCM clear the error?
320				1		Retry.
330			1			Replace the MCM.
340			2			Escalate to the next level of support.
350		N	Y			Is the cable from MCM to backpanel continuous?
360			N	Y		Is the pak in that location shorted?
370				1		Replace the pak.
380			N	Y		Is the connector plug solidly seated on the backpanel pins?
390				1		Escalate to the next level of support.
400			1			Replug the connector correctly and retry.
	(A)	(B)				

Power Status Failing

Step	(A	B)	Action
410		1	Replace the cable and retry.
420	N	Y	Does resetting the MCM clear the error?
430		1	Retry.
440	1		Replace the MCM.
450	2		Escalate to next level of support.

Wall Clock Fails to Set

(Start)
↓

Step					Action
010	N	Y			Is J5 pin 2 of the MCM at 5 V?
020		N	Y		Is pin A17 of 930 backpanel location 14 or 932 backpanel location 15 at 5 V?
030			1		Replace the TPM pak (4KB0).
040			2		Escalate to the next level of support.
050		N	Y		Is the connector plug solidly seated on the backpanel post?
060			N	Y	Unplug the pak. Is it shorted?
070				1	Replace the pak.
080			N	Y	Is the cable from the MCM to the backpanel continuous?
090				1	Escalate to the next level of support.
100			1		Replace the cable and retry.
110		1			Connect correctly and retry.
120	N	Y			Does resetting the MCM clear the error?
130		1			Retry.
140	1				Replace the MCM.
150	2				Escalate to the next level of support.

Battery Not Available LED is On

The following SAM assumes that the system is equipped with the battery backup option.

(Start)
↓

Step					
010	N	Y	Are all cabinets powered on?		
020		N	Y	Are all circuit breakers of the battery chargers on?	
030			N	Y	Remove the jumper plug on J8 of the AC junction box. Is the BATTERY NOT AVAILABLE indicator on the MCM off? Remember to replug the jumper after the test.
040				N	Y Unplug each charger one at a time while observing the BATTERY NOT AVAILABLE indicator on the MCM. The charger that turns the indicator off is the failing charger. Are the batteries in the failing charger fully charged to 240 V DC?
050					1 Replace the battery charger.
060				1	Replace the battery packs.
070			1	Replace the MCM.	
080		1	Set all breakers to ON. Check that the problem clears.		
090	1	Power all cabinets on. Check that the problem clears.			

Power Control Fault

The troubleshooting procedure for power control faults uses the structured analysis method. If you are unfamiliar with this format, refer to the module, Interpreting the SAM Table, for details.

Power Control Check for the Disk or theTape/Disk Subsystem

The procedure below assumes that the REMOTE PWR ON indicator on the MCM is on while you power on the system from the console, but that the power in a peripheral cabinet remains off.

(Start)
↓

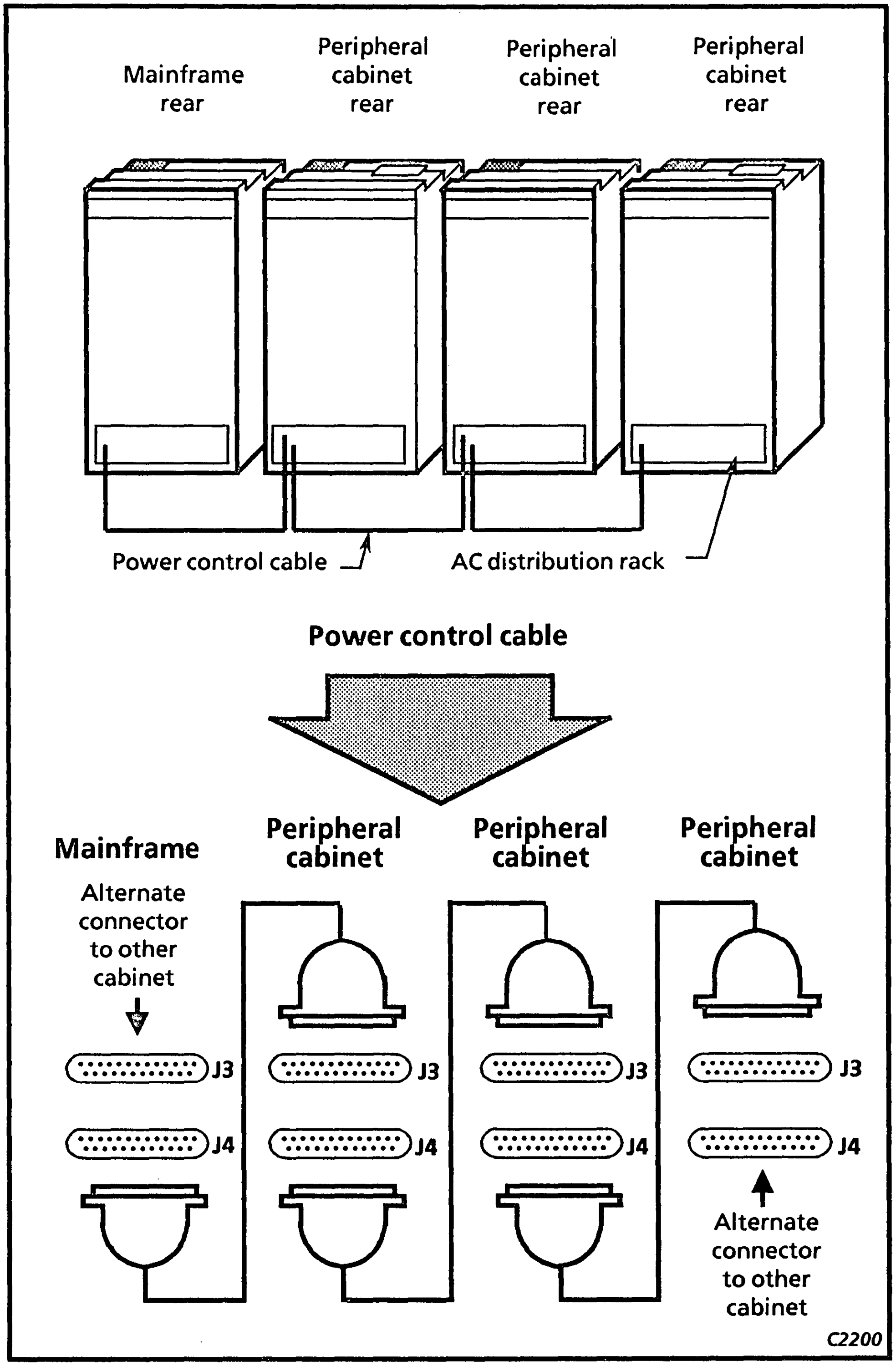
010	N	Y				Is AC connected with the circuit breaker set to ON in the peripheral cabinet?
020		N	Y			Is the service switch set to SYSTEM?
030			N	Y		Is the power control cable connected?
040				N	Y	Remove the power control cable. Are 12 to 18 V on pins 3 and 4 of the cable?
050					1	Replace the AC distribution rack.
060				N	Y	Is there 12 to 18 V on pins 3 and 4 in J3 and J4 of the mainframe AC junction box?
070					1	Replace the power control cable.
080				1		Replace the AC distribution rack of the mainframe.
090			1			Connect the cable and retry.
100		1				Set the service switch to SYSTEM and retry.
110	1					Connect the cable. Set the breaker to ON and retry.

Power Control Check for the Tape Cabinet

(Start)
↓

010	N	Y		Is AC power on and at the correct voltage?
020		N	Y	Is the on/off switch set to the on position?
030			1	Power problem in the STU. Refer to the power-on checkout procedure in the trouble analysis section of the STU Maintenance manual.
040		1		Set the on/off switch to the on position and retry.
050	1			Correct the problem and retry.

Cabling of Remote Power Control



Degraded System Operation

Use the troubleshooting flowchart and procedures in subseqent modules to return a degraded mainframe or peripheral to full operation.

What Can Be Degraded

If the software isolates a transient error or hardware failure to a particular mainframe element or peripheral not essential to the operating system, the software prevents any further use of that element or peripheral by the operating system. The following two groups of elements or peripherals are considered degradeable:

Group A:

- Peripheral processors (PP) and channels
- Cache registers and blocks
- Segment map file and page map files
- Memory banks

Group B:

- Control module, if it does not control the system disk
- Fixed storage drive (not the system disk)
- Streaming tape unit
- ISMT adapter
- ICA, if there are two ICAs in the mainframe

How to Check the Status of the Degraded Element and Peripheral

The status of group A's elements can be viewed or reinstalled by selecting the global functions option, Hardware Status. You can view or change the status of group B's elements or peripherals under CML/VE or NOS/VE using these commands:

DISPLAY_SYSTEM_CONFIGURATION (DISSC) and CHANGE_ELEMENT_STATE (CHAES).

Refer to section 5, Maintenance Aids and Utilities, for more about CML/VE, and to NOS/VE Operations [Control Data publication 60463914] for more about NOS/VE commands.

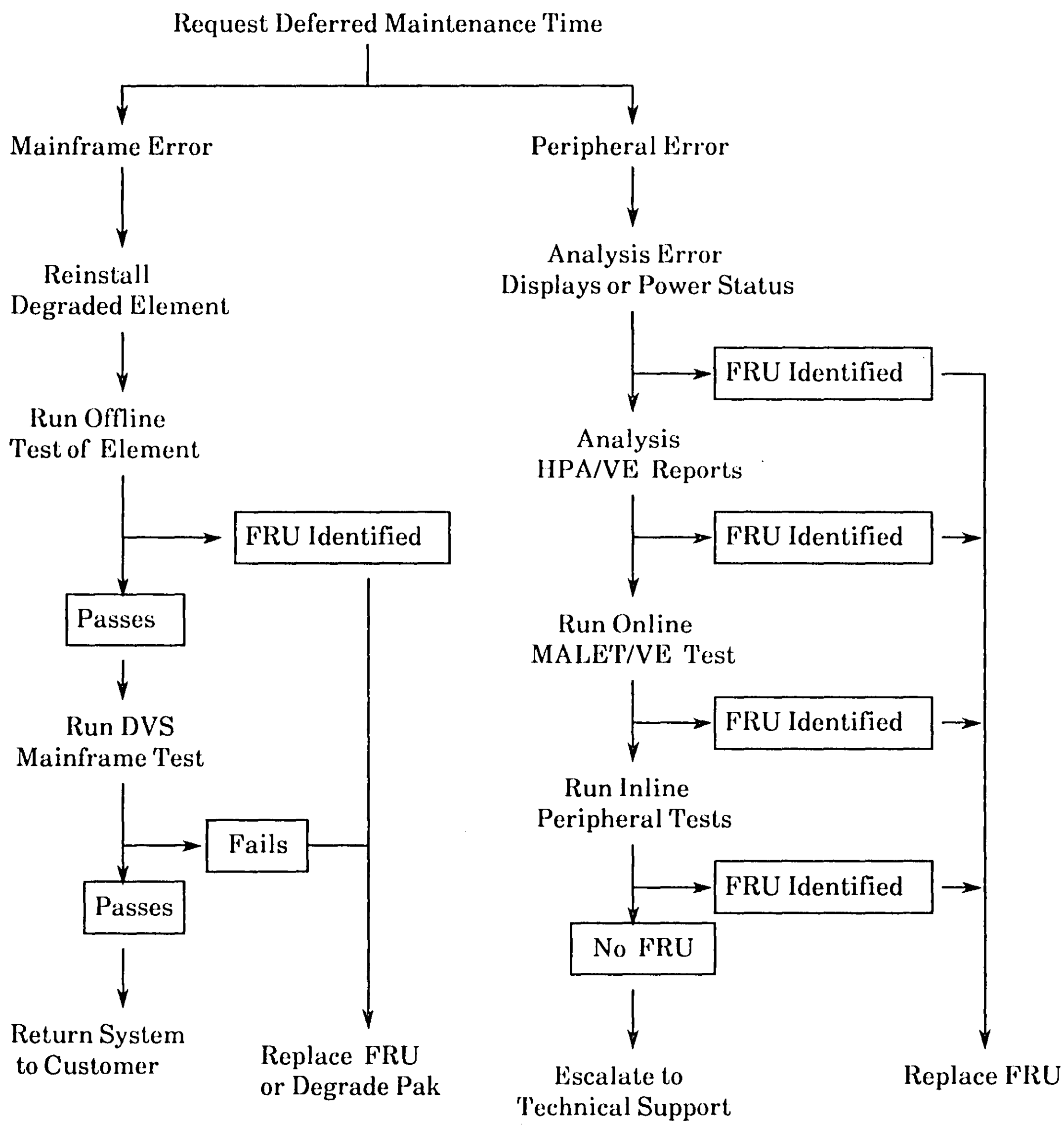
How to Troubleshoot Degraded System Operation

Maintenance on a degraded system can be deferred to a time suitable to the convenience of the customer. The troubleshooting flowchart on the next page shows how you can isolate mainframe and peripherals errors.

If the mainframe error caused the degrade, reinstate the element and run the offline test. If the offline test cannot detect an error, run the online DVS test on the element. Procedures are in the next module.

If a peripheral error or power failure caused the degrade, isolate the fault through the MALET/VE test, HPA/VE error incident report, error displays, inline peripheral test, or power status of the peripheral. If degrade is on a disk subsystem, refer to the module, Disk Subsystem, for procedures. If degrade is on a tape subsystem, refer to the module, Tape Subsystem, for detailed procedures.

Degraded System Troubleshooting



Reinstating a Degraded Mainframe

Refer to the following procedure to return a degraded mainframe to full operation.

Reinstate Degraded Element

1. Ask the operator to terminate the operating system, if it's not terminated.

2. Press <ALT F10> then **Y** to enable maintenance mode.

3. Press <ALT F9> to access the Global Functions menu. Type **H** to view the hardware status.

4. Check the status of each mainframe element. If the element is OFF, change it to ON. If the element is DOWN, change it to UP.

5. Make a note of what is being changed so that you can select the appropriate offline diagnostics later on.

6. Press <ALT F10> then **N** to disable the maintenance mode before you return the sytem to the customer.

Run Offline Diagnostics

1. Type the first letter of the appropriate items on the console menu tree shown to get to Run Board Level Diagnostics.

2. Select the appropriate board level diagnostic(s) for execution. When in doubt, select Run Mainframe Diagnostics.

3. If the field replaceable unit is identified, refer to section 3 for the replacement procedure. If the diagnostics detect no error, run online Diagnostic Virtual System (DVS) tests.

Run Online DVS Tests

1. Initiate NOS/VE.

2. Initiate CML/VE and access to DVS according to procedures in section 5, Maintenance Aids and Utilities.

3. Select Execute DVS in Expert Batch Mode from the DVS main menu.

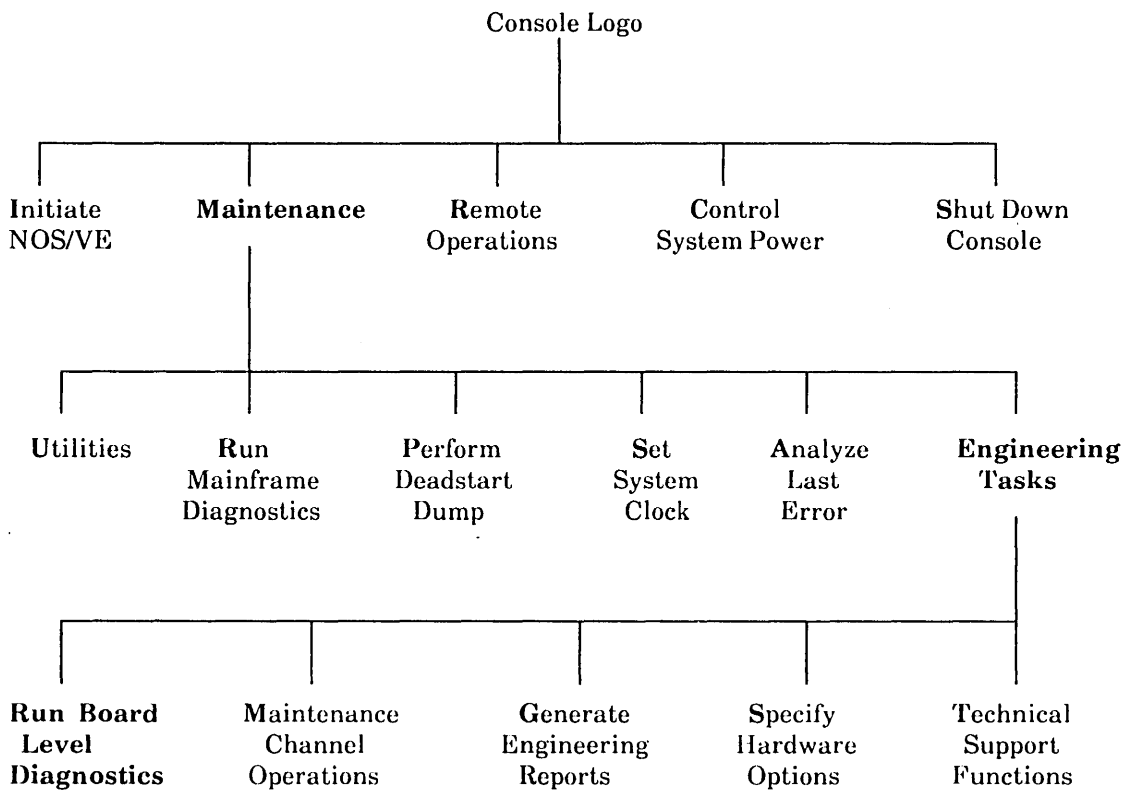
4. If you are not running all of the tests, select Test Name from the DVS Batch Parameter menu to enter the test name(s). Refer to the DVS CPU Diagnostics menu and System Diagnostics menu for the proper test names. Section 5 also contains displays of these menus.

5. Select Minute to enter the minutes you wish the tests to run. As a suggestion, 15 minutes is sufficient to detect errors.

6. Select Start DVS Execution.

7. If DVS detects no error, assume the error is intermittent and return the system to the customer. If DVS detects an error, replace the corresponding CPU pak(s) or memory pak(s).

Console Menu Tree



Isolating a Power Problem in a Peripheral Cabinet

To troubleshoot a power-related problem, determine whether it is related to cabinet power or to a subsystem within the cabinet. If the problem is isolated to a subsystem within the cabinet, refer to the hardware maintenance manual for that subsystem for further troubleshooting.

Disk Cabinet

A main circuit breaker, service switch, and a remote power control signal from the console control the AC power distribution to the control modules and disk drives. Each control module and disk drive has its own power supply unit to convert the AC cabinet power from the power bar for its internal use. To troubleshoot the disk cabinet, refer to Peripheral Cabinet Power Check on the next three pages but skip steps 060 through 110.

Tape/Disk Cabinet

The tape/disk cabinet has the same power circuits as the disk cabinet. The tape unit also has its own power supply to convert either 110 V AC or 220 V AC to its internal use. The tape unit operating on 220 V takes AC cabinet power from the power bar; whereas the tape unit operating on 110 V AC has the power cable connected directly to the wall outlet. To troubleshoot the tape/disk cabinet, refer to Peripheral Cabinet Power Check on the next three pages.

Tape Cabinet

The tape cabinet takes input power directly from the wall outlet. When troubleshooting the tape cabinet, make sure the circuit breaker on top of the tape deck is set to ON and then follow steps 060 through 110 of the Peripheral Cabinet Power Check procedure on the next page.

Remote Power Control

If powering the disk cabinets or the tape/disk cabinets on or off from the system console is unsuccessful, follow steps 010 through 050 and then steps 310 through 430 of the Peripheral Cabinet Power Check procedure on the next page.

Peripheral Cabinet Power Check

The power check procedure presented here uses the structured analysis method. If you are unfamiliar with the format of this method, look up the page number of the module, Interpreting the SAM Table, in the table of contents.

This procedure is for peripheral cabinets such as the tape/disk or disk cabinets that have an AC distribution rack.

AC Distribution Basic Check

010	Y	N	Are the battery charger circuit breaker (CB), main breaker, and service switch set to ON?
020		1	Set the battery charger CB, main CB, and service switch to ON. If the cabinet does not have a battery charger box, ignore the setting of the battery charger CB.
030	Y	N	Is relay (K1) inside the AC rack energized? If it is, you can hear a click from the AC distribution rack.
040		1	Check the fuses on the AC distribution rack. If a fuse has blown, replace it with same type and part number.
050		2	Check AC input voltage from the wall outlet. If input power is present, replace the AC distribution rack.

Tape Unit Power Troubleshooting

060	Y	N		Is tape cooling fan running?
070		Y	N	Is power present in the cable connector of the tape cooling fan?
080			1	Check AC input power to the streaming tape unit (STU) from the power bar. If power is present, replace the power cable from the power bar to the STU.
090		1		Replace the tape cooling fan.
100	Y	N		Can you power the tape unit on?
110		1		Power problem in the STU. Refer to the power-on checkout procedure in the trouble analysis section of the STU Maintenance manual.
	(A)			

(A)

Control Module Power Troubleshooting

120	N	Y		Is the error display on the control module (CM) blank?
130		Y	N	Is input power to the CM from the power bar present?
140			1	Check cable from the AC distribution rack to the power bar. Replug the cable to ensure firm contacts.
150			2	Replace the AC distribution rack.
160		1		Replace the CM- to-power bar cable.
170		2		Replace the power supply in the control module.
180		3		Replace the CM error display.

Disk Unit Power Troubleshooting

190	N	Y		Is the error display on the fixed storage drive (FSD) blank?
200		Y	N	Is input power from the power bar to the FSD present?
210			1	Check cable between power bar and AC distribution rack. Replug the cable to ensure firm mating.
220			2	Replace the AC distribution rack.
230		1		Check cable between power bar and FSD. Replug the cable to ensure firm mating.
240		2		Power problem is within the FSD. Refer to power check procedure in the trouble analysis section of the FSD Maintenance manual.
250	Y	N		Press the START button on the FSD control panel. Is the disk spun up and ready?
260		1		Power problem is within the FSD. Refer to power check procedure in the trouble analysis section of the FSD Maintenance manual.

Battery Backup Troubleshooting

270	Y	N	Pull the power cord of the AC distribution rack from the wall outlet and check the AVAILABLE ON LINE indicator. A flashing indicator means that the battery backup is online. Is the battery backup operational?

(A B)

Step	(A	B)	Action
280		1	Replace battery charger box.
290		2	Replace all battery packs.
300		3	Replace the AC distribution rack.

Remote Power Control Troubleshooting

Step			Action
310	N	Y	Set the service switch to SYSTEM and select from the power control menu of the console to power the entire system on. Can the cabinet power on from the system console?
320		1	Stop.
330	N	Y	Is this the only cabinet that does not power on?
340		1	Ensure that both ends of the power control cable leading from the last cabinet are firmly in place in their connectors.
350		2	Replace the power control cable leading from the last cabinet.
360		3	Replace the AC distribution rack.
370	1		Isolate the first cabinet that fails to power up or down in the power control link by tracing the cable from the mainframe AC distribution rack.
380	2		Ensure that cables leading from the last cabinet and going to the next cabinet at J3 and J4 connectors of the AC distribution rack are firmly in place.
390	3		Replace the power control cable.
400	4		Replace the AC distribution rack.
410	5		Problem may be in the mainframe. Refer to the module, Mainframe Power Troubleshooting, in this section.

Analyze HPA/VE reports and run DVS tests to isolate repeated failures in system operation. An alternative for detecting repeated errors is to run the system validation suite according to the procedure in section 5.

How to Access the Error Incident Reports of HPA/VE

1. Use the reported fault symptoms to isolate the area--memory, CPU, IOU, disk, tape, or ICA--that caused the problem.

2. Refer to section 5, Maintenance Aids and Utilities, for procedures to initiate CML/VE.

3. Select the CML/VE Configuration Utility from the main menu.

4. Mark down the element's name and the configuration of the problem area. Return to the main menu to access HPA/VE.

5. Display the error incident report of your choice according to the procedures in section 5.

6. Analyze the report(s) to isolate the field replaceable unit. If the problem area is in the ICA, disk, or tape subsystem, refer to the modules about ICA, disk, or tape subsystem troubleshooting for a report analysis.

7. Replace the field replaceable unit based on information from the analysis.

If HPA/VE reports fail to indicate the repeated failure, escalate to the next level of support or run DVS tests in expert mode for a period of time that is related to the frequency of the repeated failure. Procedures for running DVS in expert mode are in Diagnostic Virtual System Usage [Control Data publication 60469720]. However, an easier procedure for running DVS in expert mode by CML/VE is as follows:

How to Run DVS in Expert Batch Mode

1. If CML/VE is not initiated, initiate it according to the procedure in section 5.

2. Select DVS and press <Return> at the prompt of the CML/VE main menu.

3. From the DVS menu select Execute DVS in Expert Batch Mode.

4. The console displays the DVS Batch Parameter menu shown on the next page.

DVS Batch Parameter Menu

```
CML__340 - DVS BATCH PARAMETER MENU

 1. Test__Name                  = ALL
 2. Selected__Utility__Processor = 0
 3. Selected__Test__Processor    = 0
 4. Job__Name                   = DVS
 5. Reduce__Task__Priority       = FALSE
 6. Test__Copies                = 1
 7. Job__Copies                 = 1
 8. Active__Tasks               = 9
 9. Hours                      = 0
10. Minutes                    = 1
11. Abort__On__Error            = TRUE
12. User                       = FALSE
13. Load__Map                  = FALSE
14. Output__File               = $SYSTEM .HARDWARE__MAINTENANCE .DVS .HISTORY
15. Multiprocessor__Option      = FALSE

16. Display Test Parameters
17. Start DVS execution
Parameter values may be changed by selecting the appropriate menu number.
Enter the number of an option, or type a command (BACK / MAIN__MENU / HELP).
CML?
```

5. If you are not running all the tests, select Test Name to enter the test name(s). Refer to the DVS CPU Diagnostics menu and System Diagnostics menu for the proper test names. Section 5 also contains displays of these menus.

6. Select Hours and then Minutes to enter the hours and minutes you wish the tests to run.

7. Select Start DVS Execution.

Troubleshoot the disk subsystem by using section 2 and the disk drive hardware maintenance manual. If the disk drive is a fixed storage drive, refer to the Fixed Storage Drive Hardware Maintenance Manual [Control Data publication 83325610]. If the disk drive is an expanded module drive, refer to the Expanded Module Drive Hardware Maintenance Manual [Control Data publication 83325830]. Before moving to subsequent modules about the following actions, become familiar with the troubleshooting practices and basic approaches given here.

- Interpreting CM3 error codes
- Analyzing disk error incident reports
- Analyzing MALET/VE disk tests

NOS/VE monitors all disk subsystems that are defined in the system configuration. If NOS/VE detects an unrecovered disk error or failure, it formats and displays the failure data in a critical display window of the system console regardless of the impact the failure has on the system. A critical display window is referred to in the upper section of the console display.

All unrecovered disk errors have the following display format in the critical window:

CH?? C? U?? - (message ????????????????), C??? T?? S??
<symptom statement>
SR????, RP dddd dddd dddd dddd dddd dddd dddd dddd dddd dddd
ER????, dddd dddd dddd dddd dddd dddd dddd dddd dddd dddd

Where:

CH?? C? U?? identifies the channel, equipment (CM), and unit (disk) numbers respectively.

C??? T?? S?? indentifies the physical media address of the failing operation.

<symptom statement> describes the symptom of the failure. The statement is similar to the message in the message table in the module, Analyzing a Disk Error Incident Report.

SR????, RP dddd... contains the contents of the status register of the IPI channel in hexadecimal and the first ten words of the response packet from the control module.

ER????, dddd... contains the contents of the error register of the IPI channel and the second ten words of the response packet.

Failure on System Disk or System-Critical Disk

No online display is possible if the failure is in the system disk. For a failure in the system-critical disk that holds system files, NOS/VE formats and displays the failure data in the critical display window but does not sustain task execution.

In either case, execute the offline diagnostics according to the following steps or follow the steps, Preliminary Checks before Troubleshooting a Disk Subsystem, in this module.

1. Make sure you ask the operator to record the disk message displays on the console. If a console printer is available, print the console screen by pressing <Shift PrintScrn>.

2. Type **terminate_system** to terminate NOS/VE if it is not already terminated.

3. Press <Alt F2> to return to console mode.

4. If the contents of the IPI error register (ER??) is not zero, the IPI channel hardware has detected lost data or a parity error. Run the board-level diagnostics according to the channel pak.

5. Run the offline disk test according to the procedure in the module, Disk Coldstart Troubleshooting. Use the channel, equipment, and unit numbers from the message display as input parameters for the disk test.

Failure on Disk Subsystems Other than the System Disk

If the system can continue executing tasks, the failure data for non-system-critical disk subsystems is in the NOS/VE Engineering Log and HPA/VE error incident report. You should then troubleshoot online using MALET/VE, DVS, or HPA/VE. Remember to record the message displayed on the console.

If a console printer is available, press <Shift PrintScrn> to print the screen before you follow the steps in the next two pages for preliminary checks before troubleshooting a disk subsystem.

Troubleshooting Practices

The following generally apply to disk subsystem troubleshooting:

- Go through part or all of a troubleshooting process several times, if necessary, to isolate an intermittent failure.

- Run the HPA/VE or MALET/VE test from your service center if possible. Refer to section 5, Maintenance Aids and Utilities, for the procedure for establishing the remote link.

- If troubleshooting time expires, request the next level of support.

- For assemblies within the disk drive, refer to the disk drive hardware maintenance manual for removal, replacement, and troubleshooting procedures.

  If the disk drive is a fixed storage drive, refer to the FSD Hardware Maintenance manual [Control Data publication 83325610].

  If the disk drive is an expanded module drive, refer to the XMD Hardware Maintenance manual [Control Data publication 83325830].

  For all other assemblies in the disk subsystem such as the channel pak, peripheral processor, control module, disk control panel, and interface cables, use the CYBER 930 Maintenance Guide.

Preliminary Checks before Troubleshooting a Disk Subsystem

Complete the following steps when troubleshooting a disk subsystem:

1. Does any equipment in the subsystem fail to power on?

   Yes
   ——→ Refer to the module, Isolating a Power Problem in a Peripheral Cabinet. If the disk drive is an expanded module drive, refer to the CM-3 Hardware Maintenance Manual [Control Data publication 83325670]

   No ↓

2. Does the disk subsystem fail to complete the coldstart operation?

   Yes
   ——→ Refer to the module, Disk Coldstart Troubleshooting.

   No ↓

3. Does the control module display an error code other than 00?

   Yes
   ——→ Refer to the module, Interpreting a Control Module Error Code.

   No ↓

4. Does the error display on the disk drive display an error code other than 00?

   Yes
   ——→ Refer to the maintenance section of the disk drive Hardware Maintenance manual.

   No ↓

5. Execute the MALET/VE disk subsystem test according to procedures in section 5. Does the test module detect an error?

   Yes
   ——→ Refer to the module, Analyzing MALET/VE Disk Test.

   No ↓

6. Display the HPA/VE reports with an OPEN status according to the procedure in section 5. Does the report detect the errors?

   Yes
   ——→ Refer to the module, Analyzing a Disk Error Incident Report.

   No ↓

7. Run the offline disk subsystem test according to the module, Running the Disk Diagnostic.

Interpreting a Control Module Error Code

If the control module diagnostics detect an error condition, an error code is displayed in the two-hexadecimal-digit display on the front of the control module. The code indicates the cause of the error.

The CYBER 930 Computer System can initiate three kinds of diagnostics on the disk subsystem: the hardcore diagnostics during power-on reset, controller diagnostics, and drive diagnostics.

The control module (CM) also runs background diagnostics whenever its command operating system is idle. If the operating system initiates the diagnostics, the CM returns a response packet that contains the results of the diagnostics to the system. The control module also displays the hardware errors detected during hardcore diagnostics, fatal errors detected during controller diagnostics, or unrecoverable errors detected during background diagnostics.

The hardcore diagnostics take about 45 seconds to complete. During the execution, the hexadecimal-digit display cycles through codes. If the diagnostics pass without error, the display stops changing and ends at 00. If a fatal error occurs, an error code is displayed to indicate the cause of the error.

Diagnostic Error Codes

Most error codes require the display of four hexadecimal digits. For these errors, the display indicates FF, followed by the first two digits, then the last two digits. This cycle continues with the display changing about two times per second. For example, FF...04...01...FF...04...01...FF... and so on.

Maintenance Action for Error Codes

If the error display is blank, replace successively the control module power supply and the hexadecimal display.

The following table lists all of the possible error and normal displays. If an error other than the normal status display occurs, record the error code and execute the hardcore diagnostics manually. To execute the diagnostics manually, turn CM power off and on by setting the CM on/off switch. Set this switch from the back of the cabinet.

If the display stops changing and ends at 00 after diagnostics finish, the problem is intermittent and does not require a parts replacement. If an error display reappears, replace the main logic board in the CM. Make sure that you write the error code on the return parts tag and the maintenance activity form when returning the defective board.

If the error code is 41 (an overtemperature condition), check the CM fan operation. If it is not running, replace the fan.

CM3 Diagnostic Error Codes (Sheet 1 of 3)

*	Code	Meaning
S	00	Command Operating System (COS) IML is complete and is initialized into running status.
S	01 00	The MPU RAM test is executing.
	02	An error was detected by the MPU RAM memory test.
	03	An error was detected during a stack operation.
*	04 XX	An error was detected by the EEPROM write test.
*	05 XX	An error was detected by the MPU diagnostic port test.
*	06 XX	An error was detected by the PTM (MC6840) test.
*	10 XX	An error was detected by the MAGIC errors test.
*	11 XX	An error was detected by the MAGIC registers test.
S	12 XX	The data buffer memory test is running.
*	13 XX	An error was detected by the data buffer test.
*	20 XX	An error was detected by the IPI-2 sequencer chip group 0 tests.
*	21 XX	An error was detected by the IPI-2 sequencer chip group 1 tests.
*	22 XX	An error was detected by the IPI-2 sequencer chip group 2 tests.
*	23 XX	An error was detected by the IPI-2 sequencer chip group 3 tests.

* Alternating display that starts with FF (hexadecimal).
XX Failing subtest number.
S Status code.

CM3 Diagnostic Error Codes (Sheet 2 of 3)

*	Code	Meaning
*	24 XX	An error was detected by the IPI-2 control chip test.
*	25 XX	An error was detected by the ECC chip tests or IPI-2/MAGIC functional tests.
*	28 XX	An error was detected by the IPI0 sequencer chip group 0 tests.
*	29 XX	An error was detected by the IPI0 sequencer chip group 1 tests.
*	2A XX	An error was detected by the IPI0 sequencer chip group 2 tests.
*	2B XX	An error was detected by the IPI0 sequencer chip group 3 tests.
*	2C XX	An error was detected by the IPIC0 errors test.
*	2D XX	An error was detected by the IPIC0 logic test.
	2E XX	An error was detected by the IPIC0 functional test.
*	30 XX	An error was detected by the IPI1 sequencer chip group 0 tests.
*	31 XX	An error was detected by the IPI1 sequencer chip group 1 tests.
*	32 XX	An error was detected by the IPI1 sequencer chip group 2 tests.
*	33 XX	An error was detected by the IPI1 sequencer chip group 3 tests.
*	34 XX	An error was detected by the IPIC1 errors test.

* Alternating display that starts with FF (hexadecimal).
XX Failing subtest number.

CM3 Diagnostic Error Codes (Sheet 3 of 3)

*	Code	Meaning
*	35 XX	An error was detected by the IPIC1 logic test.
*	36 XX	An error was detected by the IPIC1 functional test.
-	38 - -	An error was detected by checksum operation of EEPROM. If the display is a steady 38, an update of EEPROM is possible by reloading microcode. If the display is a flashing FF...38...XX, it is a hard failure that requires main logic board replacement.
	3C	A false bus error was detected by the 68010 POR initialization test, self-test, or the MPU memory test.
*	3D 00	A false bus error was detected by the 68010 after the MPU memory test. The display is either a steady 3D, or the alternating pattern of FF...3D...00.
*	3E 00	An unexpected exception condition was detected by the 68010. The display is either a steady 3E, or the alternating pattern of FF...3E...00.
*	3F	An unexpected external condition was detected by the 68010. The display is either a steady 3F, or the alternating pattern of FF...3F...00.
	40	Command Operating System (COS) was initialized in degraded mode. A failure was detected in one of the IPI ports. The IPI failure was logged.
S	41	An overtemperature condition was detected. A thermal switch on the logic board sensed a temperature greater than 50°C(122°F). A temperature exceeding 65°C (150°F) causes all control module power to shut off. An error was detected by the power-on initialization/ checksum test, or the 68010 self-test.

* Alternating display that starts with FF (hexadecimal).
XX Failing subtest number.
S Status code.

Analyzing a Disk Error Incident Report

A disk error incident report contains error entries about the disk subsystem and identifies the hardware--either the control module or the disk drive--that causes the error conditions. When you examine the disk error incident report, apply the following guidelines for FRU replacement.

The Report Analysis Section

The report analysis section gives you a summary of the reported element. This summary includes a message subsection that gives the NOS/VE evaluation of the cause of each error. If the report contains an unrecovered error during a read or write operation, use the maintenance action table below for your next action. The maintenance action is based on the message summary in the report.

Message	Maintenance Action
Function Timeout Channel Empty When Activated Period Counter Parity Upper ICI Parity Lower ICI Parity IOU Error	1. Examine the IOU error incident report for isolation, or 2. Terminate NOS/VE and execute the board level diagnostics on the designated PP and channel paks.
PP-CM3 Data Integrity Can't Select CM3 Bit Significant Response Error No Sync In Sync In Did Not Drop Upper/Lower IPI Channel Parity IPI Sequence Error Slave In Not Set Slave In Did Not Drop Incomplete Transfer Channel Stayed Active Buffer Counter Parity Sync Counter Parity Lost Data Bus Parity Command Reject Sync Outs Not Equal Sync Ins Bus B Acknowledge Incorrect No CM3 Interrupt Ending Status Wrong	Replace the following FRUs successively: 1. Main logic board in control module. 2. I/O panel assembly in control module. 3. IPI cable to the mainframe bulkhead. 4. Channel pak. 5. Channel-to-bulkhead IPI cable.

Message	Maintenance Action
Controller Failure Internal Controller Error CM3 Intervention Required CM3 Machine Except Command Exception Microcode Execution Error Alternate Port Execution Unexpected Response	1. Ensure you use the correct revision level of control module microcode. 2. Replace the main logic board in the control module.
Drive Intervention Required Physical Interface Check Operation Timeout Uncorrectable Data Check Fatal Error Position Lost	1. Execute the MALET/VE test IDT on the disk drive being reported. 2. If status code appears in the disk hexadecimal display, refer to the disk drive hardware maintenance manual. 3. Perform the read, write, or seek checks according to procedure in disk drive hardware maintenance manual.
Drive Failure <aa, bb, cc, dd>	Replace successively the failing FRUs according to the FRU code <aa, bb, cc,dd>. Refer to the Coding of Field Replaceable Unit table in the disk drive hardware maintenance manual for code interpretation.
Data Transmission Failure	Replace successively the control module-to-disk PDI cable, I/O panel assembly in the control module, and interface board in the disk drive.
CM-Drive Data Integrity	1. Examine the error incident report on the central memory for clues. 2. Replace the bulkhead-to-control module IPI cable. 3. Escalate to the next level of support.

Analyzing a MALET/VE Disk Test

When the MALET/VE disk test IDT detects an error during execution, it displays error messages in one of the three formats: parameter entry errors, read or write data compare errors, and IPI driver detected errors. Maintenance actions depend on the error message and the displayed error format. If the error format is an IPI-driver-detected error, refer to the next two modules.

Error Format for Parameter Entry Errors

```
00  IDT - CM3 DISK SUBSYSTEM TEST
01  IDTNN - (M----------------------T)
02
03  (E---------------M)
04  (E---------------D)
05  DEVICE CODE = DDDDB
06  P0 - P4  PPPP  PPPP  PPPP  PPPP  PPPP
07  P5 - P9  PPPP  PPPP  PPPP  PPPP  PPPP
10
11  PARAMETERS DESCRIBED IN MODULE IDT99
```

Where:

NN	=	Module number; *(M---T)* is the module title;
E---M	=	Access level or parameter error message;
E---D	=	Description of the error if parameter error;
DDDD	=	Device code;
PPPP	=	Contents of the parameter word in hexadecimal.

The IDT disk test has eight test modules (IDT00, 01, 03, 05, 07, 09, 11, and 13). You can execute them independently using the MALET/VE command RUN, IDTXX where XX is the number of the module you want to run. Usually, you run IDT in default mode without specifying parameters; the test executes modules 00 through 09.

The above error format displays only when you run the stand-alone any-sector-test module IDT11, or the drive diagnostics module IDT13 where you need to enter parameters and specify the access level (AL). The module IDT13 requires an AL of 10, whereas the IDT11 requires an AL of 3 or 4. If you have a parameter entry error, refer to the following valid entries.

Valid Parameter Register Entries

P0 - XXXX - Data pattern used by IDT13, IDT11.
0 0 0 0 - Use random data patterns (default)

P1 - XXXX - Cylinder for data testing by IDT11. Valid entry is 0000 through 1274 (octal), 0700 (decimal), or 026C (hexadecimal).

P2 - 00XX - Track for data testing by IDT11. Valid entry is 0000 through 0027 (octal), 0023 (decimal), or 026C (hexadecimal).

P3 - 00XX - Sector for data testing by IDT11. Valid entry is 0000 through 0056 (octal), 0046 (decimal), or 002E (hexadecimal).

P4 through P9 - Not used by IDT11.

Error Format for Read or Write Data Compare Errors

```
00   IDT - CM3 DISK SUBSYSTEM TEST
01   IDTNN - (M----------------------T)
02
03   ABORTED ON DATA COMPARE ERROR
04                 WORD MMMH
05
06                       EA = YYYYB
07
10   IB = IIII IIII IIII IIII IIII IIII IIII IIII
11   0B = 0000 0000 0000 0000 0000 0000 0000 0000
12
13   B0-B7   = BBBB BBBB BBBB BBBB BBBB BBBB BBBB BBBB
14   B8-B15 = BBBB BBBB BBBB BBBB BBBB BBBB BBBB BBBB
```

Where:

NN	=	Module number; *(M---T)* is the module title;
MMMM	=	Word of sector where error occurred (hexadecimal);
YYYY	=	The error address (EA) register where the error occurred (octal);
IIII	=	Contents of the input buffer (hexadecimal) starting at error location;
0000	=	Contents of the output buffer (hexadecimal). Starting location is relative to the input buffer error location;
BBBB	=	Contents of the B registers (octal).

If a module detects a read or write data compare error, take the following maintenance actions successively:

1. Check the two-digit error displays on the control module and the disk drive. If the CM error display is not zero, refer to the module, Interpreting a Control Module Error Code. If the disk drive error display is not zero, refer to the maintenance section of the FSD or the XMD Hardware Maintenance manual.

2. Perform the read and write checks on the disk drive according to the procedure in the trouble analysis section of the FSD or the XMD Hardware Maintenance manuals. You may want to reexecute the failing IDT module before these checks.

3. Replace successively the channel pak, the CM-to-bulkhead cable and the bulkhead-to-channel cable.

4. If you suspect a disk driver problem, escalate to the next level of support.

IPI Driver-Detected Error

Intelligent peripheral interface (IPI) driver-detected error is displayed in a format shown below. To determine what action to take, you need to know the error indication and meaning of each bit of the general status word in the error message before you go to the next module for the appropriate maintenance action.

Error Format for Disk Driver-Detected Errors

```
00  IDT - CM3 DISK SUBSYSTEM TEST
01  IDTNN - (M----------------------------T)
02      ABORTED ON (C-------------------------M)
03  (E------------------------------------M)
04      EC=XXXX EA=YYYYB
05
06  B0-B7  = BBBB BBBB BBBB BBBB BBBB BBBB BBBB BBBB
07  B8-B15 = BBBB BBBB BBBB BBBB BBBB BBBB BBBB BBBB
10           DRIVER GENERAL STATUS WORD = S S S S H
11  FAILING TASK = T T D    LOW LEVEL ERROR CODE = L L H
12  (L------------------------------------------------S)
13  (L------------------------------------------------D)
14               RESPONSE PACKET (HEX)
15  1D  - RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
16  9D  - RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
17  17D - RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
20  25D - RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
21  33D - RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
22  41D - RRRR RRRR RRRR RRRR RRRR RRRR RRRR RRRR
```

Where:

NN	=	Module number; *(M---T)* is the module title
C--M	=	Command that caused the abort
E--M	=	Description of the error code
XXXX	=	The error code in octal
YYYY	=	The error address register where the error occurred (octal)
BBBB	=	Contents of the B registers (octal)
SSSS	=	IPI common driver general status word (hexadecimal)
TT	=	IPI driver failing task (decimal)
LL	=	IPI driver low-level error code (hexadecimal)
L---S	=	Description of failing low-level sequence
L---D	=	Description of the failing condition
RRRR	=	Contents of IPI channel response packet (hexadecimal)

What to Do with Driver-Detected Errors

For IPI driver-detected errors, analyze the 16-bit driver general status word. Normally, you do not need to analyze the response packet. The error code, low-level error code, failing task, and the contents of the B registers are there for your information.

The table below shows the error indication and the meaning of each bit of the general status word. The table excludes unused bits 54 through 56. If one or more of these bits are set, perform the suggested maintenance action in the next module.

General Status Word

48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63

Bit	Meaning and Description
48	**Fatal error.** A hardware-related error detected by the driver or controller that prevents further status information. If bit 49 is also set, it indicates that the controller received a critical response packet.
49	**Status error.** The response packet of the error message reveals a CM3 or drive-related error. Bits 57 through 63 are the status indications.
50	**DCB entry error.** The calling program has placed all illegal values in the driver control block (DCB). The low-level error code and description indicate the type of error.
51	**Task busy.** A previously issued task is not completed and a response packet is not ready.
52	**Conditional success.** First attempt has failed but retry is successful. First failure data is contained in the response packet.
53	**IPI adapter error.** An error is in the adapter's IPI error register of the channel pak.
57	**Drive busy.** The designated drive is reserved to another port.
58	**CM/drive path not operational.** The controller or drive cannot send or receive commands.
59	**Drive not ready.** The drive is not spun up and ready.
60	**Select, deselect, or reset sequence failed.**
61	**Send command packet sequence failed.**
62	**Read or write data sequence failed.**
63	**Receive response packet sequence failed.**

Maintenance Action for a Driver-Detected Error

If the IDT disk test reports a driver-detected error, use the information from the general status word and the low-level error code as an indicator of the appropriate maintenance action.

When one or more bits of the general status word are set, refer to the following for your next step:

Bit 48 (Fatal Error) Is Set but Bit 49 (Status Error) Is Not Set

Successively take actions A, I, D, and H from the maintenance action table.

Both Bits 48, 49 Are Set

Check bits 60 through 63. If one of these bits is also set, take action as indicated below:

Bit 60:	Successively take actions A, I, D, and J from the maintenance action table.
Bit 61 or 63:	Successively take actions A, B, D, and C in the Maintenance Action Table.
Bit 62 :	Successively taken actions L, A, B, E, J and N in the Maintenance Action Table.

Bit 49 Is Set

Check bits 57 through 63. If the setting bit is from bits 60 through 63, take the same action as above. If the setting bit is from bits 57 through 59, take action indicated below:

Bit 57:	Wait until the drive is not busy and reexecute, or ask the operator to have dedicated access to the drive by changing the drive status to DOWN before reexecution.
Bit 58:	Check the low-level error description. If the indication is that the drive is not ready and operational, successively take actions B, F, K, and C. If the indication is that the controller is not ready and operational, successively take actions A, G, and M from the Maintenance Action Table.
Bit 59:	Successively take actions F and B.

Bit 50 Is Set

Check the low-level error code description and make the necessary correction. If the problem persists, take actions I and N from the Maintenance Action Table.

Bit 53 Is Set

If the problem persists after retry, successively take actions I and N in the Maintenance Action Table.

Maintenance Action Table

A. Check the two-digit error display on the control module. If the CM error display is not zero, refer to the module, Interpreting a Control Module Error Code.

B. Check the two-digit error display on the disk drive. If the error display is not zero, refer to the maintenance section of the FSD or XMD Hardware Maintenance manuals.

C. Replace the CM-to-FSD or XMD PDI cable.

D. Replace the CM-to-bulkhead IPI cable.

E. Perform the read and write checks on the disk drive according to the procedure in the trouble analysis section of the FSD or XMD Hardware Maintenance manuals. You must reexecute the failing IDT module for these checks.

F. Ready the disk drive. Check the following before reexecuting the IDT diagnostic:

- Power switch (SI) on the disk drive power supply is set to ON.
- START switch on the disk drive control panel is set to ON.
- If the Local/Remote switch on the drive I/O board is set to Local, reset it to Remote.

G. Ready the control module. Verify that the service switch is set to SYSTEM, the main breaker is set to ON, and the power switch at the back of the CM is set to ON.

H. Replace the bulkhead-to-channel IPI cable.

I. Replace the IPI channel pak.

J. Replace the CM main logic board.

K. Replace the FSD I/O (VCX) board or the XMD I/O (WLX) board. Refer to the FSD or XMD Hardware Maintenance manuals for the replacement procedure.

L. Execute IDT module 13 to run the inline drive diagnostics using the command RUN, IDT13.

M. Replace the CM I/O board.

N. If you suspect a disk driver problem, escalate to next level of support.

Running the Disk Diagnostic

You must run the disk diagnostic offline. Therefore, before executing the disk diagnostic make sure that NOV/VE is terminated . The diagnostic executes in less than two minutes. If an error occurs, the P and A register displays stop cycling. The values displayed provide status and error codes.

Follow the procedure below to execute the disk diagnostic. If an error occurs, refer to the following pages for explanations of the contents of the P and A registers for further isolation.

How to Execute the Disk Diagnostic

A disk test resides on the operator's console. After you terminate NOS/VE, key in the following sequence to select the test:

<Alt F2>	to exit NOS/VE, if necessary, and return to console Main menu
M	to select Maintenance
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
D	to select Diagnostics
S	to select Subsystem Tests
D	to select Disk Test
E	to display the SST Diagnostic Parameters menu

SST Diagnostic Parameters (OCTAL)

Parameter word	Value	Value
00	? ?	? ?
02	? ?	
04		
06		
08		
10		
12		
14		

Enter: the channel number in word 0
the equipment number (control module address) in word 1
the unit number (disk address) in word 2
Press <F3> to save

Enter **S** to select the deadstart peripheral processor
Enter **00** if the channel number is in the range 01 through 05,
20 if the channel number is in the range 20 through 25

Ensure that the deadstart PP number and the parameter entries are correct. Return to the Disk Test menu and enter **R** to execute the disk test.

If no errors occur, the test monitor returns to the Subsystem Tests menu. If the test detects an error, the displays of the P and A registers on the console stop cycling. The contents of the P and A registers are displayed in the following form:

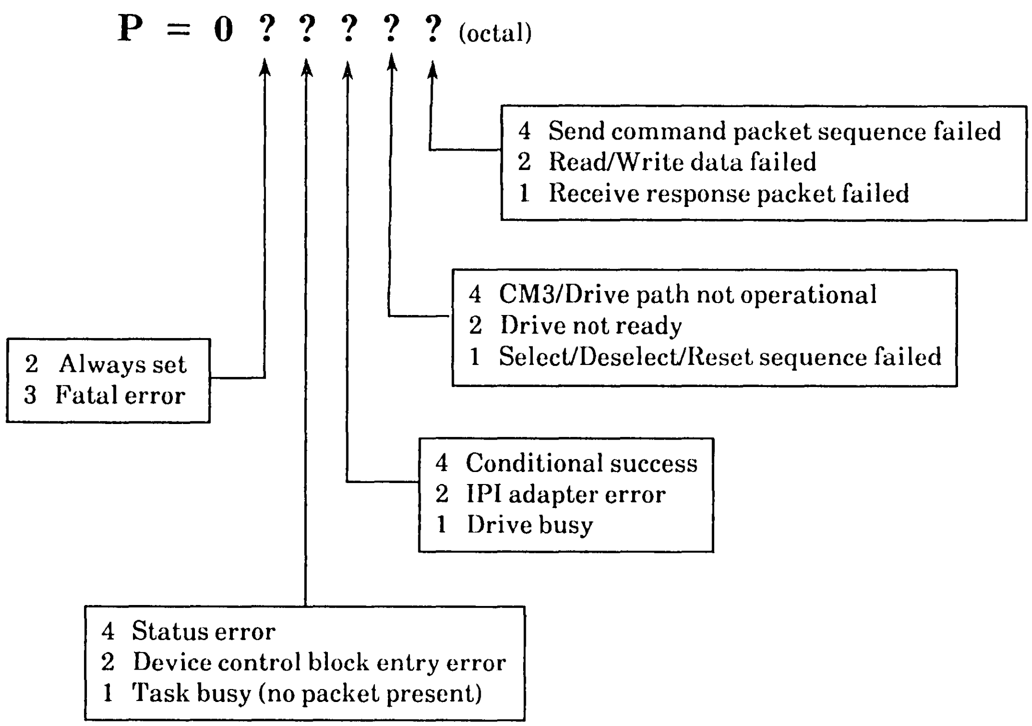
P = ? ? ? ? ? ?   A = ? ? ? ? ? ?

Record the contents of the P and A registers and see the explanation for the contents of the P and A registers for further isolation.

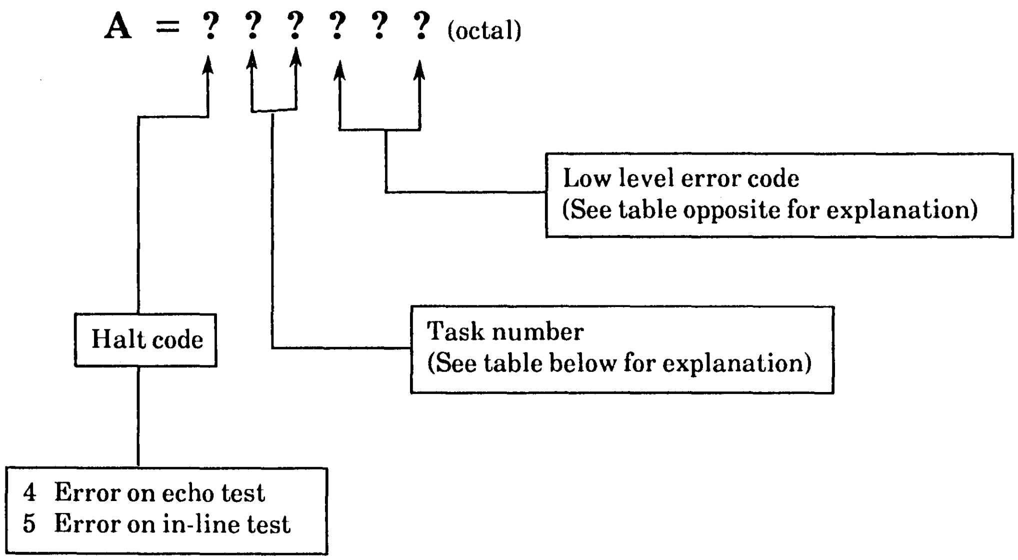
The information on the interpretation of the content of the error code is also contained in the HELP display. To access the help display:

Press <Esc> to return to the Subsystem Tests menu.
Use the space bar to highlight the Disk Test.
Press <Shift F1> to display the help screens for the disk test.

Contents of the P Register



Contents of the A Register



Task Number (octal)	Description
01	Master/selective reset
02	Select controller
03	Deselect controller
04	Reserve drive
05	Release drive
06	Seek
07	Seek-read data
10	Seek-write data
11	Read data from controller buffer
12	Write data to controller buffer
13	Select/seek - read/deselect
14	Select/seek - write/deselect
15	Perform controller diagnostics
16	Perform drive diagnostics
17	Request drive type

Low-level Error Code (octal)	Description
013	Channel full after t-registers loaded
016	Channel active before function out
017	Channel active 1 μs after function out
021	No asynchronous response on selective reset
041	Slave-in rise-time out error
042	Unknown controller address received
043	Channel error after select status byte received
061	Sync-in rise time-out error
062	Wrong bus acknowledge byte received
063	Channel error flag after bus acknowledge byte
064	Sync-in fall time-out error
101	Word count residue after information transfer out
102	Channel empty when adapter inputs word
121	Slave-in rise time-out error
122	Channel error flag after ending slave status received
123	Information transfer unsuccessful
141	No slave interrupt byte present
142	Channel error after slave interrupt received
143	No controller interrupt within an allotted time
161	Word count residue after information transfer in
162	Channel empty when adapter input expected
201	Slave-in fall time-out error
221	Slave-in rise time-out error
222	Channel error after transfer setting byte received
223	Slave-in fall time-out error
340	Operation unsuccessful
341	Task busy (no response packet received yet)
342	Data transfer or slave-in time-out error
343	Unexpected class 2 interrupt received
344	Unexpected class 1 interrupt received
345	Unknown response type received
346	Unexpected asynchronous response received
347	Command had conditional success
350	Critical error during ending status sequence
351	Unsuccessful data burst transfer
352	Drive not operational and ready
353	Controller not operational and ready
354	Unrecoverable data error
360	Invalid task specified
361	Invalid controller address specified
362	Invalid drive address specified
363	No data transfer length specified

Tape Subsystem

The following tape subsystem troubleshooting information is for the intelligent small magnetic tape (ISMT). For troubleshooting information on the 5698 CYBER Magnetic Tape Subsystem (IPI tape drive), refer to appendix B in this book.

Use the troubleshooting tables, which use the structured analysis method (SAM), and the STU Hardware Reference/Maintenance Manual [Control Data publication 49763100] to troubleshoot the ISMT. Before using the tables, become familiar with the conventions and troubleshooting practices shown below and these topics that are covered in subsequent pages:

- Interpreting the SAM table
- Initiating operator diagnostics
- Initiating customer engineer (CE) diagnostics

Conventions

Unless otherwise indicated, the following conventions apply in the troubleshooting tables:

- Troubleshooting tables and procedures assume that a malfunction is caused by failure of a single part, and that the wiring and connectors are good. However, always check applicable wiring and connectors before replacing a suspected part.
- Some procedures are referenced from another procedure and assume that certain steps have been performed according to the procedure containing the reference. To avoid confusion, follow the isolation/correction process from start to finish and avoid performing procedures out of sequence.
- Steps such as opening and closing cabinet doors do not appear in the procedure.

Troubleshooting Practices

The following general notes apply to troubleshooting the intelligent small magnetic tape subsystem:

- Prior to initiating any diagnostic test at the customer site, make a thorough visual inspection of the streaming tape unit.
- Go through part or all of a troubleshooting process several times, if necessary, to isolate a failure that is intermittent.

- Close the lid of the streaming tape unit to run diagnostics or operate the tape. If the lid is open, an operational error code appears on the display panel and tape operation stops.

- Whenever power is removed from the mainframe, reload the ISMT adapter controlware by initiating NOS/VE or running the tape subsystem tests (CIP tape tests) according to the procedure in the module, Tape Deadstart Troubleshooting.

- If two tape units are connected to the same channel, make sure that you remove the logic cables of the tape unit being serviced from the mainframe bulkhead. This allows the system to continue to access the other unit.

- Rerun/retest the original failing mode/sequence after each corrective action before proceeding to the next corrective action. If the symptoms change, it may be necessary to restart troubleshooting at the beginning of SAM table 1.

- Request the next level of support when troubleshooting time has expired or when all the corrective actions for a specific question have been completed.

- When doing a power-on check on the intelligent small magnetic tape, ensure the fan of the streaming tape unit is operational. This indicates cabinet power is present at the streaming tape unit.

Replacing Assemblies

- Removal and replacement procedures for the assemblies within the tape unit itself are in the STU Maintenance manual. Procedures for the following assemblies that are related to the intelligent small magnetic tape subsystem are in the CYBER 930 Maintenance Guide:

  - Tape control panel
  - Intelligent small magnetic tape adapter (logic pak)
  - Channel pak
  - Peripheral processor (PP) pak
  - Interface cable between mainframe and streaming tape unit (the bulkhead-to-STU cable).

- If you replace the tape interface board, make sure that the remote density select switch is enabled or is the same setting as the replaced interface board. For detailed switch locations, refer to the Streaming Tape Unit Hardware Maintenance manual [Control Data publication 49762900].

Interpreting the SAM Table

The structured analysis method (SAM) presents fault isolation information in a logic format. Refer to the SAM format example and the following to interpret the SAM table.

SAM uses simple Yes or No responses to a sequence of troubleshooting questions to lead you to a corrective action. The corrective actions most likely to succeed are listed first. If several actions have the same probability of correcting the fault, the one that takes the least time is listed first.

How to Follow the SAM Table

Title → **Model 810/830 power-down troubleshooting**

Advisory information → **This SAM table is for isolating the cause of the Model 810/830 computer system powering down on a fault condition. Use the power distribution and warning manual to locate the components and schematic diagrams.**

Step reference number → 001

Response → N (step 003)

Action to perform → 1 (step 007)

Underlining shows last action → 2 (step 010)

Linkage shows page continuation → (A) (B)

Step						
001	N	Y				Is "C.B. OFF" indicator on?
002		N	Y			Is "SMOKE DET" indicator on?
003			N	Y		Is "FAULT" indicator on in logic column 1 or column 2 at rear of cabinet?
004				N	Y	Smoke or burn smell in column with LED lite ?
005					1	Locate burnt pak. Inspect area in and around burnt pak location (connectors and adjacent paks).
006					2	Power down machine completely and repair damage as necessary.
007				1		Power down machine completely. Replace smoke detector assembly for faulty column.
008				2		Replace protect module assembly (1A1/2A1) for faulty column.
009			1	3		Replace power control module (3A1A1) on 60-Hz power section.
010			2	4		Repair using standard troubleshooting technique.
011		N	Y			400- Hz circuit breakers at rear of cabinet or on optional power supply tripped.
012			1			Reset circuit breaker.
013			2			If circuit trips go to 400-Hz power SAM.
014		1				Replace power control module (3A1A1) on 60-Hz power section and power down machine completely.
	(A)	(B)				

C2114

Initiating Operator Diagnostics

If a fault code appears on the tape control panel, the operator usually performs test 01 of the operator diagnostic using the procedure below to direct his or her next action. If the operator cannot correct the problem, the fault code, which appears after running test 01, is forwarded to you for further troubleshooting. You must run the operator diagnostic because it is an integral part of the troubleshooting tables.

Initiate the operator diagnostic (test 01) by checking the tape transport status and following the test procedure as follows:

Transport Status

1. Transport is powered on. The LOGIC ON indicator is lit.
2. Scratch tape is threaded through the tape path and onto the take-up reel, but is not loaded (untensioned).

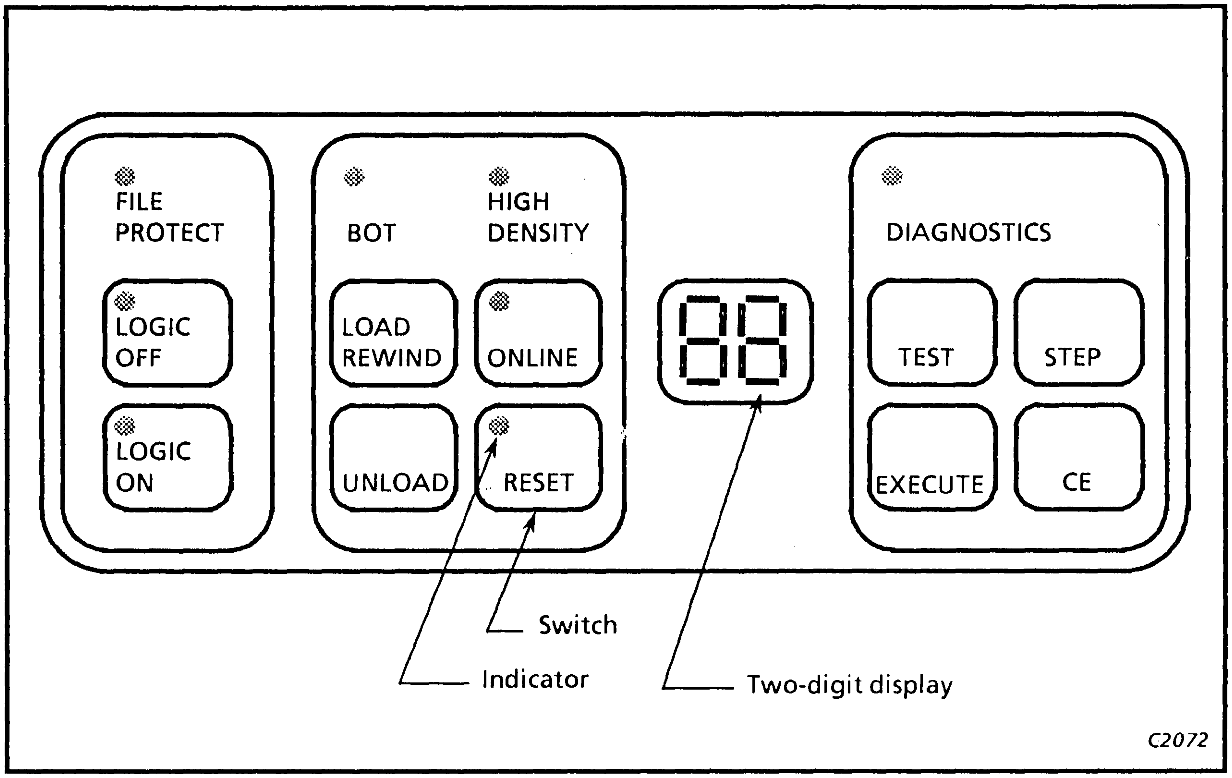
Test Procedure

1. Press the TEST switch.
   a. The DIAGNOSTIC indicator lights.
   b. Display panel indicates 01.
2. Press the EXECUTE switch.
   a. The test starts with the display panel incrementing from 00, 11, 22, through 99. Verify that all segments of the numerical display are functioning.
   b. Simultaneous with step a above, the following indicators light: FILE PROTECT, LOGIC ON, ON-LINE, RESET, and DIAGNOSTICS.
   c. The test continues with motion and read/write exercises for about ten minutes.

The transport performs a rewind/unload operation and, if the test runs to completion, the two-digit hexadecimal display indicates 00.

If the test is unsuccessful, the test terminates and a fault code is displayed. You can view a subfault code, if available and when the fault code is still indicated on the display, by pressing and holding the CE switch. You will need these codes when referring to the STU Hardware Reference Maintenance Manual [Control Data publication 49763100] for further troubleshooting.

Operator Control Panel - Tape Unit



Initiating Customer Engineer Diagnostics

The Customer Engineer (CE) Diagnostics are an integral part of the troubleshooting tables. Initiate CE tests as follows:

Transport Status

Status requirements of the transport are listed in the individual SAM troubleshooting tables.

Test Procedure

1. While pressing the CE switch, press the TEST switch.

   a. The DIAGNOSTIC indicator lights.

   b. The display panel indicates 00.

2. Press the STEP switch.

   a. The display number increments each time you press STEP or increments automatically when you press and hold STEP.

   b. To facilitate test number selection, use the following procedure; for example, test 91 selection is required.

   - Press and hold the STEP switch until 09 appears on the display panel.

   - Press the TEST switch. The 9 transfers to the left. The display now indicates 90.

   - Press the STEP switch again until the display increments from 90 to 91.

3. Press the EXECUTE switch to initiate the test.

If the test runs to completion, the display panel indicates 00. If the test fails, the display panel indicates the fault code. You can view a subfault code, if available, when the fault code still displays, by pressing and holding the CE switch. You will need these codes when referring to the STU Maintenance manual for further troubleshooting.

Operator Control Panel - Tape Unit

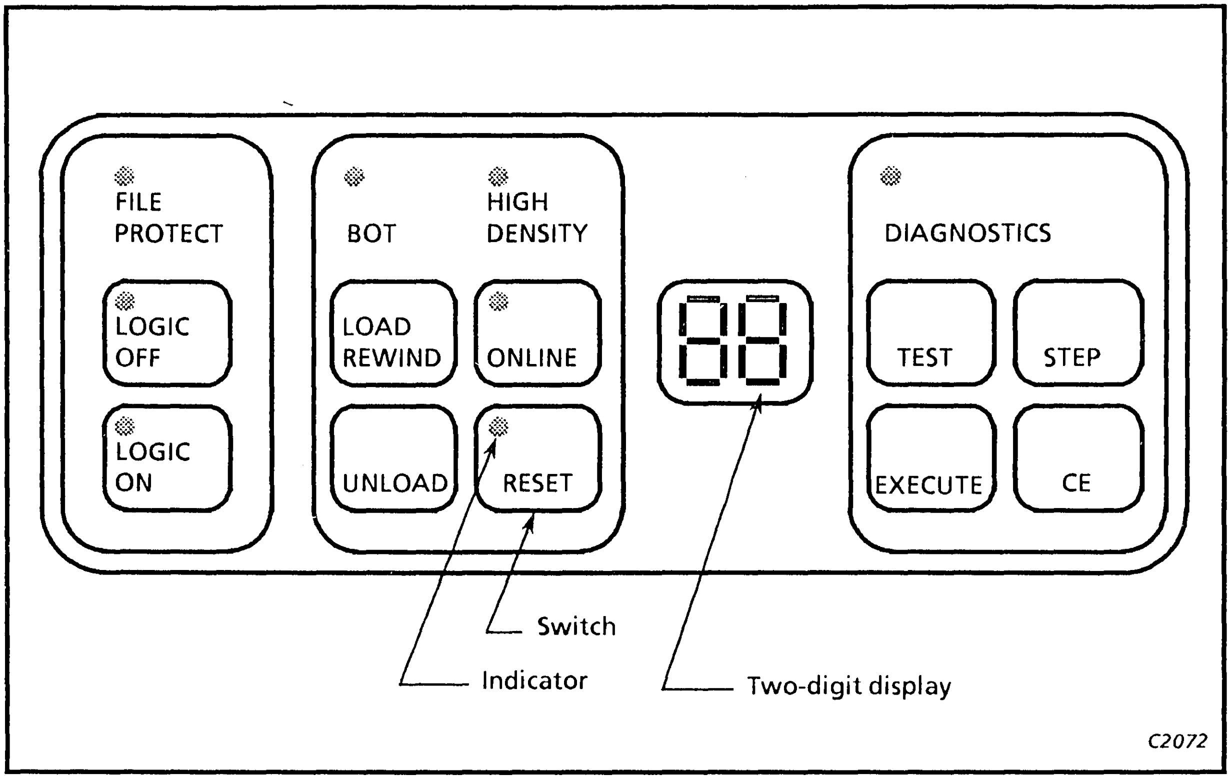


Table 1 is the starting point for troubleshooting the tape subsystem. Follow the instructions in these tables until you fix the problem.

Table 1. ISMT Subsystem Troubleshooting

(Start)

010	N	Y	Does STU control panel display a fault code?
020		1	Refer to trouble analysis section of STU Maintenance manual.
030	N	Y	Run STU operator test 01 on scratch tape. Do the diagnostics indicate a fault code?
040		1	Refer to trouble analysis section of STU Maintenance manual.
050	N	Y	Is there a CIP deadstart (autoload controlware from tape function 06uu) problem?
060		1	Go to table 2.
070	N	Y	Is there a tape warmstart (function 012U or 013U) problem?
080		1	Go to table 3.
090	N	Y	Is there an autoload controlware from PP (function 04XX) problem?
100		1	Go to table 4.
110	N	Y	Run ITW diagnostic online according to MALET/VE execution procedure in section 5. Does ITW diagnostic indicate an error?
120		1	Go to table 5.
130	N	Y	Display HPA/VE error incident report according to procedure in section 5. Does HPA/VE report errors?
140		1	Go to table 6.
150	N	Y	Does problem still exist?
160		1	Go to table 7.
170	1		Stop.

Table 2. CIP Deadstart (Function 060U) Troubleshooting

Assumption: A CIP tape that contains the adapter microcode is mounted and ready on the ISMT unit. A CIP deadstart was attempted, but controlware does not load correctly.

010	Y	N	Is the STU operator panel fault code blank?
020		1	Refer to trouble analysis section of STU Maintenance manual.
030	Y	N	Run STU operator test 01 on scratch tape. Is the termination code 00?
040		1	Refer to the trouble analysis section of STU Maintenance manual.
050	N	Y	Retry execution of the MSL or CIP deadstart program. Is retry successful?
060		1	Stop.
070	N	Y	Run offline CIP Tape Tests according to the procedure in the module, Tape Deadstart Troubleshooting. Does the console display a channel error code (000001 through 000007) in the A register?
080		1	Recheck parameters of channel, equipment, and unit for the deadstart device.
090		2	Replace ICI channel pak.
100		3	Replace ISMT adapter.
110	N	Y	Does the console display an error code 4 or 5 in the P register and either a 001XXX, 002XXX, or 005XXX in the A register?
120		1	Go to table 9 and perform troubleshooting for error code XXX.
130	1		Replace the ICI channel pak.
140	2		Replace the ISMT adapter.
150	3		Replace the STU interface board.
160	4		Check/replace the bulkhead-to-STU cable .
170	5		Request the next level of support to check/replace adapter-to-ICI-channel and adapter-to-bulkhead cables.

Table 3. Tape Warmstart (Function 012U or 013U) Troubleshooting (Sheet 1 of 2)

Assumption: The proper warmstart procedure is used for the ISMT subsystem. The ISMT subsystem only supports warmstarting with CIP tape level V007/L678 or newer.

010	Y	N		Is STU operator panel fault code blank?
020		1		Refer to trouble analysis section of the STU Hardware Maintenance Manual [Control Data publication 49763100].
030	Y	N		Did tape move forward?
040		Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
050			1	Refer to trouble analysis section of STU Maintenance manual.
060		1		Reload controlware.
070		2		Replace STU interface board. Refer to STU Maintenance manual for removal procedure.
080		3		Replace ISMT adapter.
090		4		Replace ICI channel board.
100		5		Check/replace adapter-to-ICI-channel, adapter-to-bulkhead, and bulkhead-to-STU cables.
110		6		Replace PP pak.
120	N	Y		Retry warmstart with a known good tape. Is retry successful?
130		1		Replace original warmstart tape.
140	Y	N		Run STU operator test 01 on scratch tape. Is termination code 00?
150		1		Refer to trouble analysis section of STU Maintenance manual.
	(A)			

Table 3. Tape Warmstart (Function 012U or 013U) Troubleshooting (Sheet 2 of 2)

	(A)		
160	N	Y	Run ITW diagnostic modules 01, 03, 05, 07, and 09 from disk according to MALET execution procedure in section 5. Is an error reported?
170		1	Replace ISMT adapter.
180		2	Replace ICI channel pak.
190		3	Run IOU diagnostics (LDS and channel test).
200		4	Request next level of support to replace adapter-to-ICI channel cable.
210	N	Y	Run ITW diagnostic modules 11 and 13 from disk. Is an error reported?
220		1	Replace STU interface board.
230		2	Replace ISMT adapter.
240		3	Replace bulkhead-to-STU cable.
250		4	Replace adapter-to-bulkhead cable.
260	1		Request next level of support.

Table 4. Controlware Autoload (Function 0414) Problems

Assumption: Operating system is downloading controlware record MB465 to the adapter and is reporting controlware load errors.

010	N	Y		Is this a new release of operating system or controlware record MB465?
020		1		Check for an adapter FCO requirement for this controlware release.
030		2		Go to next step (040).
040		N	Y	Try an older version of the operating system or controlware. Does it load properly?
050			1	Replace new release.
060	1	1		Replace ISMT adapter.
070	2	2		Replace ICI channel pak.
080	3	3		Suspect PP/ICI channel. Run mainframe diagnostics (IOU and channel).
090	4	4		Request next level of support to replace adapter-to-ICI-channel cable.

Table 5. ITW Diagnostic Error

Assumption: ITW diagnostic was executed with proper parameters set and modules were executed in order 01, 03, 05, 07, 09, 11, and 13.

010	N	Y	Is ITW module 01 through 09 reporting the error?		
020		1	Replace ISMT adapter.		
030		2	Replace ICI channel pak.		
040		3	Run mainframe diagnostics (LDS and CII tests) and take action as directed by diagnostics.		
050		4	Request next level of support to check/replace adapter-to-ICI-channel cable		
060	N	Y	Is ITW module 11 reporting the error?		
070		N	Y	Is it an STU-not-ready error?	
080			1	Make STU ready. Refer to the Operator's Guide [Control Data publication 60469560], if needed.	
090		Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?	
100			1	Refer to trouble analysis section of STU Maintenance manual.	
110		1	Replace STU interface board. Refer to STU Maintenance manual.		
120		2	Replace ISMT adapter.		
130		3	Replace bulkhead-to-STU cable.		
140		4	Request next level of support to replace adapter-to-bulkhead cable.		
150	N	Y	Is there a parameter entry error?		
160		1	Correct parameter.		
170	N	Y	Is ITW module 13 detecting an error and displaying error code ITW13 E0110 and also a fault/subfault code?		
180		1	Refer to trouble analysis section of the STU Maintenance manual.		
190	1	Replace STU interface board. Refer to STU Maintenance manual.			
200	2	Replace ISMT adapter.			
210	3	Replace bulkhead-to-STU cable.			
220	4	Request next level of support to replace adapter-to-bulkhead cable.			

Table 6. HPA/VE or NOS/VE Error Log Messages

Assumption: The HPA/VE or NOS/VE error log is reporting error messages and the ISMT Error Incident Report is available.

010	Y	N		Is the general status word 1, alert bit 11 (4XXX) set?
020		N	Y	Is the message a recovered-error, controlware-loaded, or cumulative-status message?
030			1	Stop.
040		Y	N	Run STU CE test 91 on scratch tape. Is termination code 00?
050			1	Refer to the trouble analysis section of the STU Maintenance manual.
060		1		Replace ISMT adapter.
070		2		Replace ICI channel pak.
080		3		Request next level of support to replace adapter-to-ICI-channel cable.
090	N	Y		Is status word 3 = XX70 (word 3 of GS01-DS08 line)?
100		1		The lower 9 bits of status word 10 (decimal) contain an adapter error code. Go to table 9.
110	Y	N		Do the lower 7 bits of status word 3 contain all zeros?
120		1		Status word 3 contains an error code. Go to table 16.
130	Y	N		Run STU CE test 91 on scratch tape. Is termination code 00?
140		1		Refer to the trouble analysis section of the STU Maintenance manual.
150	1			Go to table 8 to analyze the ISMT status.

Table 7. Undefined ISMT Problem

010	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
020		1	Refer to trouble analysis section of STU Maintenance manual.
030	Y	N	Run STU CE test 91 on scratch tape. Is termination code 00?
040		1	Refer to trouble analysis section of STU Maintenance manual.
050	1		Reseat adapter and ICI channel pak.
060	2		Check bulkhead-to-STU cable.
070	3		Replace ISMT adapter.
080	4		Replace ICI channel pak.
090	5		Replace STU interface board. Refer to STU Maintenance manual.
100	6		Request next level of support to check/replace adapter-to-ICI-channel and adapter-to-bulkhead cables

Table 8. ISMT Status Decoding (Sheet 1 of 2)

010	N	Y		Is bit 7 (X2XX) of status word 3 (word 3 of GS01-DS08 in Error Incident Report) set?
020		1		Replace ISMT adapter.
030	N	Y		Is bit 8 (X4XX) of status word 3 set?
040		1		Replace ISMT adapter.
050		2		Replace ICI channel pak.
060		3		Request next level of support to replace adapter-to-ICI-channel cable.
070	N	Y		Is bit 10 (2XXX) of status word 3 set?
080		1		This indicates an STU problem. Sense bytes SB06, 17, and 18 contain fault symptom code and subfault codes. Refer to fault code troubleshooting in the trouble analysis section of the STU Maintenance manual.
090	N	Y		Is bit 9 (1XXX) of status word 3 set?
100		N	Y	Are the majority of errors reported in HPA/VE on only a few tapes (VSNs or REELs)?
110			1	Replace tape.
120		1		Clean tape path. Refer to the Operator's Guide [Control Data publication 60469560].
130		2		Run STU CE test 37 and 48.
140		3		Run STU CE test 30.
150		4		Run STU CE test 54.
160		5		Replace STU interface board. Refer to the STU Maintenance manual.
170		6		Replace ISMT adapter.
180		7		Check/replace bulkhead-to-STU cable.
190		8		Request next level of support to check/replace adapter-to-bulkhead cable.
	(A)			

Table 8. ISMT Status Decoding (Sheet 2 of 2)

	(A)		
200	N	Y	Is bit 11 (4XXX) of status word 3 set?
210		1	Suspect software error.
220		2	Replace ICI channel pak.
230		3	Replace ISMT adapter.
240		4	Replace STU interface board. Refer to the STU Maintenance manual.
250		5	Check/replace bulkhead-to-STU cable.
260		6	Request next level of support to check/replace adapter-to-ICI-channel and adapter-to-bulkhead cables.
270	N	Y	Is bit 1 (unit check) in first sense byte X2 (hexadecimal) set?
280		1	This indicates an STU problem. Sense bytes SB06, 17, and 18 contain fault symptom code and subfault codes. Refer to fault code troubleshooting in the trouble analysis section of the STU Maintenance manual.
290	1		Replace ICI channel pak.
300	2		Replace ISMT adapter
310	3		Replace STU interface board.
320	4		Check/replace bulkhead-to-STU cable.
330	5		Request next level of support to check or replace adapter-to-ICI channel. and adapter-to-bulkhead cables.

Table 9. Status Word 10 or 1 Octal Error Codes

Assumption: Usually, these codes are reported in lower 9 bits of general status word 10 and are flagged by error code 70 reported in lower 7 bits of general status word 3. During controlware autoload (function 0414 or 06UU), error codes are reported as 5XXX in general status word 1.

Error Code	Maintenance Action	Error Code	Maintenance Action	Error Code	Maintenance Action
001	Take action A	203	Replace adapter	232	Replace adapter
003	Replace adapter	204	Replace adapter	233	Replace adapter
004	Replace adapter	206	Replace adapter	235	Replace adapter
077	Take action A	207	Replace adapter	236	Replace adapter
100	Replace adapter	210	Take action B	237	Replace adapter
101	Replace adapter	211	Take action A	240	Take action C
102	Replace adapter	220	Refer to table 10	241	Take action D
103	Replace adapter	221	Refer to table 11	242	Take action A
104	Replace adapter	222	Replace adapter	243	Refer to table 14
105	Replace adapter	223	Replace adapter	244	Refer to table 15
106	Replace adapter	224	Replace adapter	277	Replace adapter
107	Replace adapter	225	Take action A	301	Replace adapter
110	Replace adapter	226	Refer to table 12	302	Replace adapter
177	Replace adapter	227	Refer to table 13	304	Take action C
200	Replace adapter	230	Take action A	377	Take action C
201	Replace adapter	231	Replace adapter		

A Successively replace ISMT adapter, ICI channel pak, and request next level of support to replace adapter-to-ICI-channel cable.

B Analyze STU sense bytes for STU fault code and subfault code. Refer to trouble analysis section of the STU Maintenance manual.

C Run STU operator test 01 on scratch tape. If termination code equals 00, successively replace the STU interface board, ISMT adapter, bulkhead-to-STU cable, and adapter-to-bulkhead cable. If termination code does not equal 00, refer to trouble analysis section of STU Maintenance manual.

D If this is a controlware autoload operation, successively replace the ICI channel pak and ISMT adapter, and run mainframe IOU diagnostics. As the last resort, request next level of support to replace adapter-to-ICI-channel cable. If this is not a controlware autoload operation, there is no error.

Table 10. Status Word 10 or 1 Octal Error Code 220 Troubleshooting

Assumption: The proper controlware is used for the load operation. If the controlware is just released, make sure you check for an adapter FCO requirement for this controlware release.

010	N	Y		Is controlware autoloaded from tape (function 06UU)?
020	1	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
030			1	Refer to the trouble analysis section of the STU Maintenance manual.
040		Y	N	Is bulkhead-to-STU cable properly connected and undamaged?
050			1	Reseat or replace damaged cable.
060		1		Try a different CIP tape.
070	2	2		Replace ISMS adapter.
080	3			Replace ICI channel pak.
090		3		Replace STU interface board. Refer to the STU Maintenance manual.
100		4		Replace bulkhead-to-STU cable.
110	4	5		Request the next level of support to replace adapter-to-bulkhead cable.

Table 11. Status Word 10 or 1 Octal Error Code 221 Troubleshooting

010	N	Y		Is controlware autoloaded from tape (function 06UU)?
020	1	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
030			1	Refer to trouble analysis section of the STU Maintenance manual.
040		1		Try a different CIP tape.
050	2	2		Replace ISMT adapter.
060	3			Replace ICI channel pak.
070		3		Replace STU interface board. Refer to the STU Maintenance manual.
080		4		Replace bulkhead-to-STU cable.
090	4	5		Request next level of support to replace adapter-to-bulkhead cable.

Table 12. Status Word 10 or 1 Octal Error Code 226 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to the trouble analysis section of the STU Maintenance manual.
030	Y	N	Is CIP tape the proper tape for this ISMT subsystem?
040		1	Use proper CIP tape.
050	N	Y	Does the high density indicator on the STU operator control panel light?
060		1	ISMT cannot coldstart a high-density CIP tape. Use a low-density CIP tape for deadstarting.
070	Y	N	Run STU operator test 01 on scratch tape. Is termination code 007?
080		1	Refer to the trouble analysis section of the STU Maintenance manual.
090	N	Y	Was CIP tape just released?
100		1	Check for adapter FCO requirement for this CIP tape release.
110		2	Go to step 100.
120	Y	N	Clean STU tape path. See the Operator's Guide [Control Data publication 60469560] and again try to load controlware. Is the error code still 226?
130		1	Stop.
140	Y	N	Is bulkhead-to-STU cable properly connected and not damaged?
150		1	Reconnect cable or replace damaged cable.
160	1		Replace ISMT adapter.
170	2		Replace STU interface board. Refer to the STU Maintenance manual.
180	3		Replace bulkhead-to-STU cable.
180	4		Request next level of support to replace adapter-to-bulkhead cable.

Table 13. Status Word 10 or 1 Octal Error Code 227 Troubleshooting

010	Y	N	Clean STU tape path. See the Operator's Guide [Control Data publication 60469560] and again try to load controlware. Is error code still 227?
020		1	Stop.
030	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
040		1	Refer to the trouble analysis section of the STU Maintenance manual.
050	1		Replace CIP tape.
060	2		Replace STU interface board. Refer to the STU Maintenance manual.
070	3		Replace ISMT adapter.
080	4		Replace bulkhead-to-STU cable.
090	5		Request next level of support to replace adapter-to-bulkhead cable.

Table 14. Status Word 10 or 1 Octal Error Code 243 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to trouble analysis section of the STU Maintenance manual.
030	Y	N	Is CIP tape loaded, online, and on an STU with a unit number (U) of 0 through 3?
040		1	Correct condition or move tape to proper STU.
050	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
060		1	Refer to the trouble analysis section of the STU Maintenance manual.
070	Y	N	Are equipment switches on the STU interface board set correctly?
080		1	Refer to installation section of the STU Hardware Maintenance Manual [Control Data publication 49762900].
090	Y	N	Is bulkhead-to-STU cable properly connected and undamaged?
100		1	Reconnect cable or replace damaged cable.
110	1		Replace ISMT adapter.
120	2		Replace STU interface board. Refer to the STU Hardware Maintenance Manual [Control Data publication 49763100].
130	3		Replace bulkhead-to-STU cable.
140	4		Request next level of support to replace adapter-to-bulkhead cable.

Table 15. Status Word 10 or 1 Octal Error Code 244 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to trouble analysis section of the STU Maintenance manual.
030	N	Y	Run STU operator test 01 on scratch tape. Is termination code 00?
040		1	Refer to trouble analysis section of the STU Maintenance manual.
050	Y	N	Is bulkhead-to-STU cable properly connected and not damaged?
060		1	Reconnect cable or replace damaged cable.
070	1		Replace ISMT adapter.
080	2		Replace STU interface board. Refer to the STU Maintenance manual.
090	3		Replace bulkhead-to-STU cable.
100	4		Request the next level of support to replace adapter-to-bulkhead cable.

Table 16. Status Word 3 Octal Error Codes

Assumption: These error codes are reported in the lower 7 bits of general status word 3.

Error Code	Maintenance Procedures
001	Refer to table 17.
004	Refer to table 18.
005	Refer to table 19.
006	Refer to table 20.
007	Refer to table 21.
010	If the STU operator panel fault code is blank, replace the detective tape. If the STU operator panel fault code is not blank, refer to the trouble analysis section of the STU Maintenance manual.
012	Refer to table 22.
016	Run STU operator test 01 on scratch tape. If termination code equals 00, replace defective tape. If termination code does not equal 00, refer to trouble analysis section of the STU Maintenance manual.
030	Suspect software error.
031	Suspect software error.
032	Wait for operation to complete.
033	Suspect software error.
034	Suspect software error.
041	Refer to table 23.
050	Suspect software error.
051	Suspect software error.
052	Suspect software error.
055	Sucessively replace ICI channel pak, ISMT adapter, and adapter-to-ICI-channel cable.
061	Suspect software error.
062	Suspect software error.
070	Refer to status word 10 error code in table 9.

Table 17. Status Word 3 Octal Error Code 001 Troubleshooting

010	Y	N	Is power applied to STU?
020		1	Apply power to STU.
030	Y	N	Is STU cabled to adapter?
040		1	Connect bulkhead-to-STU cable.
050	Y	N	Are equipment switches on STU interface board set correctly?
060		1	Refer to installation section of STU Manual [Control Data publication 49762900].
070	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
080		1	Refer to trouble analysis section of the STU Hardware Maintenance Manual [Control Data publication 49763100].
090	1		Replace STU interface board. Refer to STU Maintenance manual.
100	2		Replace ISMT adapter.
110	3		Replace bulkhead-to-STU cable.
120	4		Request next level of support to replace adapter-to-bulkhead cable.

Table 18. Status Word 3 Octal Error Code 004 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to trouble analysis section of STU Maintenance manual.
030	Y	N	Is STU loaded and online?
040		1	Load STU and place it online.
050	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
060		1	Refer to the trouble analysis section of the STU Maintenance manual.
070	1		Replace STU interface board. Refer to the STU Maintenance manual.
080	2		Replace ISMT adapter.
090	3		Replace bulkhead-to-STU cable.
100	4		Request next level of support to replace adapter-to-bulkhead cable.

Table 19. Status Word 3 Octal Error Code 005 Troubleshooting

010	N	Y	Was STU RESET switch pressed during operation?
020		1	Rerun user job.
030	Y	N	Is STU operator panel fault code blank?
040		1	Refer to trouble analysis section of the STU Maintenance manual.
050	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
060		1	Refer to the trouble analysis section of the STU Maintenance manual.
070	1		Replace STU interface board. Refer to the STU Maintenance manual.
080	2		Replace ISMT adapter.
090	3		Replace bulkhead-to-STU cable.
100	4		Request next level of support to replace adapter-to-bulkhead cable.

Table 20. Status Word 3 Octal Error Code 006 Troubleshooting

010	N	Y	Is tape file protected?
020		1	Install write ring in the tape reel.
030	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
040		1	Refer to the trouble analysis section of the STU Maintenance manual.
050	1		Replace STU interface board. Refer to the STU Maintenance manual.
060	2		Replace ISMT adapter.
070	3		Replace bulkhead-to-STU cable.
080	4		Request next level of support to replace adapter-to-bulkhead cable.

Table 21. Status Word 3 Octal Error Code 007 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to the trouble analysis section of the STU Maintenance manual.
030	Y	N	Is the tape a 9-track PE or GCR tape?
040		1	STU is not designed to read this tape. Change tape.
050	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
060		1	Refer to the trouble analysis section of the STU Maintenance manual.
070	1		Replace defective tape.

Table 22. Status Word 3 Octal Error Code 012 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to the trouble analysis section of the STU Maintenance manual.
030	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
040		1	Refer to the trouble analysis section of the STU Maintenance manual.
050	1		Replace defective tape.

Table 23. Status Word 3 Octal Error Code 041 Troubleshooting

010	Y	N	Is STU operator panel fault code blank?
020		1	Refer to the trouble analysis section of the STU Maintenance manual.
030	Y	N	Run STU operator test 01 on scratch tape. Is termination code 00?
040		1	Refer to the trouble analysis section of the STU Maintenance manual.
050	1		Run STU CE test 37. Also run CE test 48 to preserve the automatic pump shutdown feature.

Read the following overview of the Integrated Communications Adapter (ICA) before you move on to subsequent modules to troubleshoot ICA problems.

ICA Hardware

The ICA is a logic pak that links the 930 or 932 mainframe with a communications network through an Ethernet transceiver cable. ICA has two pak types: ICA1 and ICA2. Whereas the 930 mainframe uses ICA1 or ICA2, the 932 mainframe mainly uses ICA2. The main hardware components of the ICA include a microprocessor, Ethernet controller and serial interface, direct memory access (DMA) controller, and a channel interface (CIF) for communicating with the ICI channel of the mainframe.

The ICA has three kinds of memory: 8 K words of EEPROM, 16 K words of SRAM, and 256 K words of DRAM. It also contains eight hardware registers. The general status register, which is a hardware register, provides the vital status and error information of the ICA to the mainframe.

Diagnostic Software

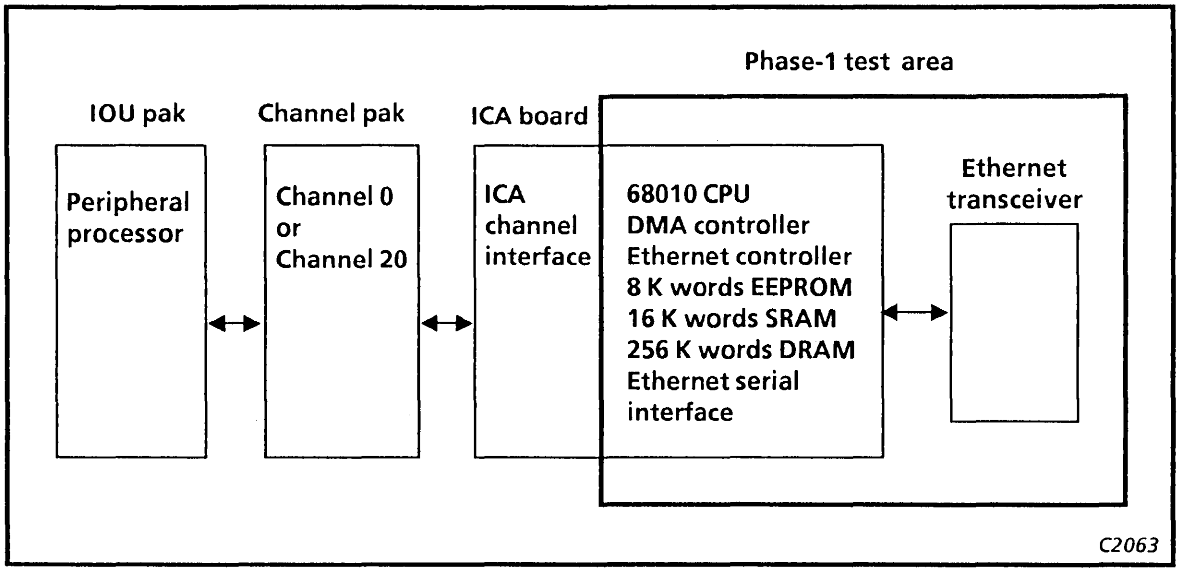
The ICA diagnostic software is a set of onboard diagnostics that resides in and is executed from the ICA EEPROM. The diagnostic software performs a functional check of the hardware including the channel interface and the Ethernet transceiver.

The diagnostics occur in two main phases as shown in the figure opposite:

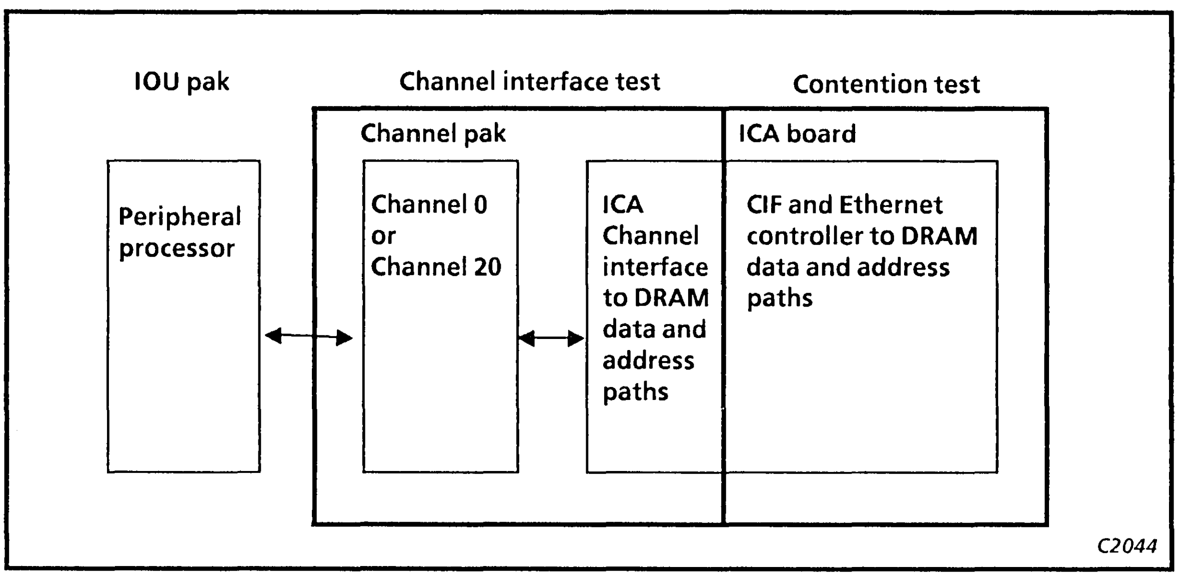
- Phase 1 tests all the ICA hardware except the channel interface.
- Phase 2 tests the channel interface and executes an ICA contention test. The function of the contention test is to exercise as much of the ICA hardware at the same time as possible.

The ICA diagnostics also log the nonfatal errors that, other than a possible slight degradation in performance into the SRAM, do not affect the normal operation of the ICA software. The same error information is also passed on to the system Engineering Log where HPA/VE uses it to generate the error incident report.

ICA Hardware and Test Area of Phase-1 Diagnostics



Test Area of Phase-2 Diagnostics

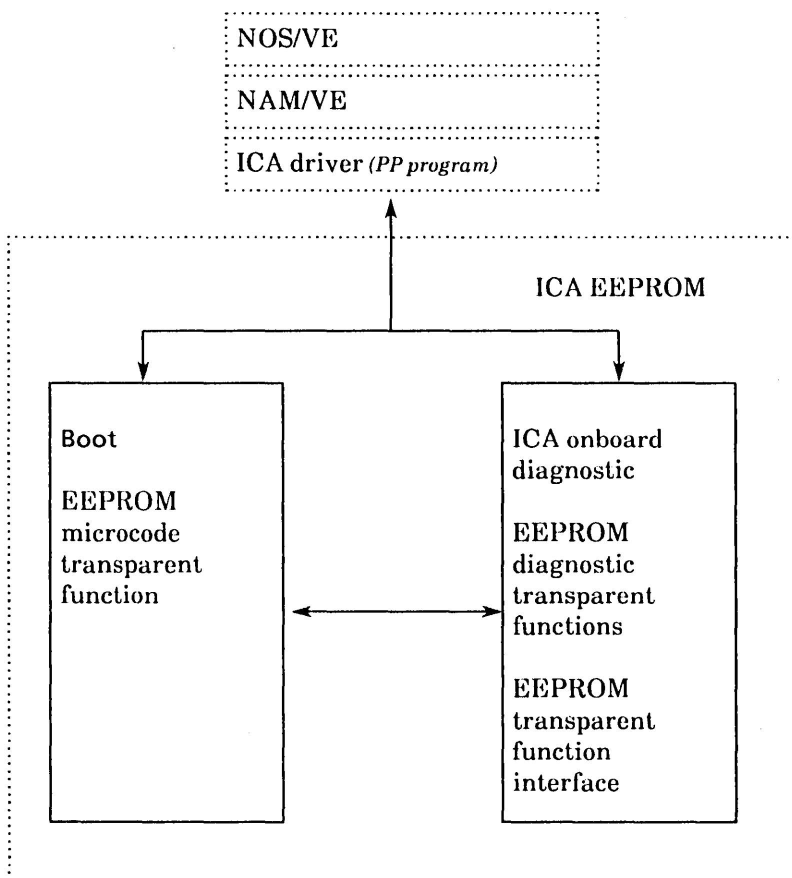


Relationship between the ICA Diagnostic Software and the System Software

The operating system monitors the ICA and its associated network through another subsystem called the Network Access Method/Virtual Environment (NAM/VE). If NAM/VE detects an error from the communications subsystem, the error information is entered in the engineering log for generation of the error incident report.

Through its ICA driver, NAM/VE normally resets the ICA to initiate the onboard diagnostics on the ICA pak. If the reset fails to restore the ICA to operation, the operating system shuts down the communications subsystem except when there is a second path to the communications subsystem (that is, when there are two ICA paks in the mainframe). The following diagram shows the architecture of how the onboard diagnostics interface with the system software.

How Onboard Diagnostics Interface with System Software



If the peripheral processor program (ICA driver) from the mainframe initiates the ICA onboard diagnostics, the driver issues a sequence of functions to execute the ICA diagnostics as follows:

Function	Explanation
1. RESET	Initiates phase-1 onboard diagnostics.
2. READ CONFIDENCE CHECK	Tests basic channel data and control lines and ability to transfer multiple words to the peripheral processor.
3. WRITE CONFIDENCE CHECK	Tests basic channel data and control lines and ability to transfer multiple words to the ICA.
4. STATUS REJECT READ CHECK	Tests the operation of the special general status logic on ICA2. This check does not run on ICA1.
5. CHANNEL ACTIVE TIMEOUT CHECK	Tests operation of the ICA channel active timeout logic.
6. START DIAGNOSTICS	Initiates phase-2 onboard diagnostics.

How to Troubleshoot the ICA

There are three ways to troubleshoot the Integrated Communications Adapter (ICA):

- Execute the offline ICA test (initiate the onboard diagnostics);
- Run the online test;
- Analyze the ICA error incident report.

See subsequent modules for details. If the problem is not in the ICA but is in the communications network (CDCNET), refer to the CDCNET Troubleshooting Guide [Control Data publication 60462630].

Initiating Onboard Diagnostics Manually

The operating system initiates the onboard diagnostics automatically through the ICA driver. Not only can you initiate the onboard diagnostics by executing the offline ICA subsystem test from the console, but you can also manually initiate them in following ways:

- Power on the mainframe cabinet;
- Toggle the master clear switch on the ICA pak.

Manually initiate the onboard diagnostics only when the operating system is not running. If the operating system is running, use online tools to run the COMCT test, analyze the error incident report, or interpret the general status word of the ICA to isolate ICA problems. See subsequent modules for details.

While running the offline ICA subsystem test from the console or initiating the onboard diagnostics manually, you can monitor the progress of the diagnostic through the indicator LEDs on the ICA board. For status interpretation on the ICA1 and ICA2, refer to the figures and tables on the next three pages.

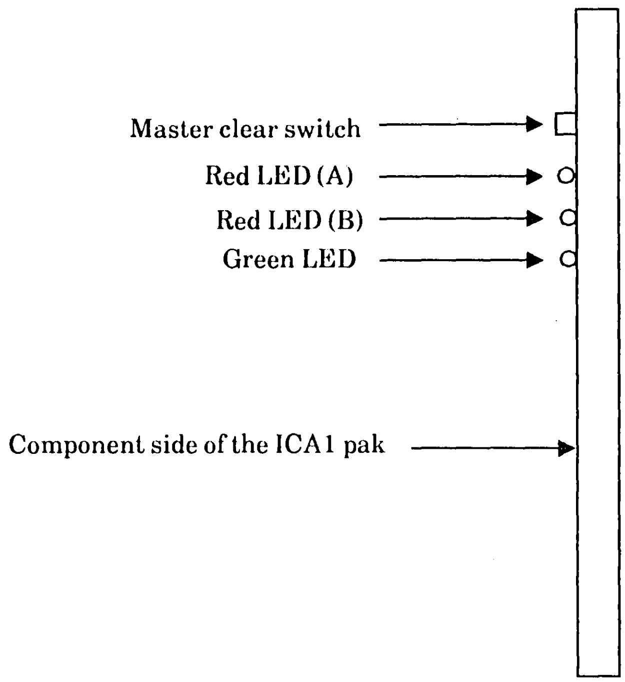
The offline ICA subsystem test executes both phase 1 and phase 2 diagnostics. If the test passes, both LEDs A and B do not light.

If you initiate the onboard diagnostic manually, only the phase 1 diagnostics is executed. Therefore, if the phase 1 diagnostic passed, LED A is not lit and LED B is lit.

NOTE

The ICA pak occupies slot 18 in the card cage and is connected to channel 0 of the channel cluster 0 pak through a backpanel cable. The second ICA pak, if installed, is in slot 17 and is connected to channel 20 of the channel cluster 2 pak.

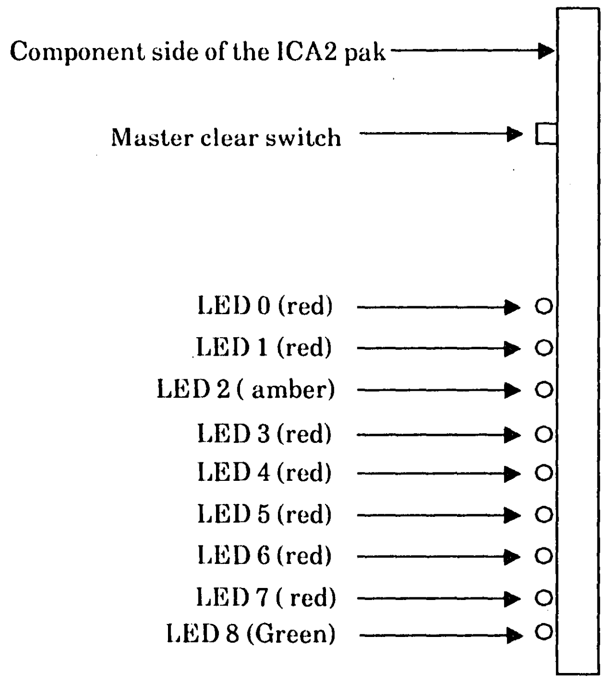
Led and Switch Location on the ICA1 Pak



When the mainframe power is on, the green LED should be on all the time to indicate power is being supplied to the transceiver. The two red LEDs have the following indications:

LED A	LED B	Onboard Status
On	On	Phase 1 failed, transceiver not tested
On	Off	Phase 1 passed, transceiver failed
Off	On	Phase 1 passed, transceiver passed
Off	Off	Phase 2 passed

Led and Switch Location on the ICA2 Pak



When the mainframe power is on, the green LED should be on all the time to indicate power is being supplied to the transceiver. The LEDs have the following indications:

LED	Name	Description
0	Fault detected	When lit, indicates fault detected. LEDs 3 through 7 display the state and error symptom code.
1	Ethernet transceiver	When lit, indicates ethernet transceiver failure.
2	Channel or diagnostic activity	When unlit, indicates no channel data transfer in progress. When lit, indicates channel data transfer in progress or phase 1 diagnostics in progress.
3 and 4	ICA state	LEDs 3 and 4 correspond to the status bits of the general status word of the ICA. LED 3 is the most significant bit. See the ICA State Table for details.
5, 6, and 7	Error symptom code	LEDs 5, 6, and 7 correspond to the symptom code of the general status word of the ICA. LED 5 is the most significant bit. See the ICA Symption Code Isolation Table for details.
8	Ethernet transceiver power	If unlit, indicates no Ethernet transceiver power

ICA State Table

LED 3	LED 4	ICA State
Off	Off	Operational
Off	On	Idle
On	Off	Diagnostics
On	On	Reset

ICA Symptom Code Isolation Table

Symptom Code	Description	Maintenance Action
0	No error detected	None
1	Unexpected transparent function	Replace the ICA pak.
2	Forced error not detected	Replace the ICA pak.
3	Channel interface failure	Replace the ICA pak.
4	ICA board failure	Replace the ICA pak.
6	No Ethernet transceiver power	Replace successively the ICA fuse (part 15185502), ICA, bulkhead-to-transceiver cable, ICA-to-bulkhead cable, and channel-to-ICA cable.
7	Ethernet transceiver failure	Replace successively the transceiver box, bulkhead-to-transceiver cable, and the ICA.

Running the Offline ICA Test

The ICA test verifies the operation of the ICA without deadstarting NOS/VE. The ICA test executes the onboard diagnostics on the ICA pak connected to the channel specified in the parameter word 0. During test execution, the console displays the P and A registers. If the test fails, the P and A registers stop cycling and the console displays a text message to identify the failing section.

See the procedure below to execute the ICA test and subsequent pages to interpret the contents of the P and A registers for maintenance action.

How to Execute the ICA Test

1. Make sure that NAM/VE and NOS/VE are terminated and the console is in console mode.

   NOTE

   If the mainframe is powered off and then on again, wait 1 minute before you run the ICA test from the console. Because the powering on and off sequences initiate the ICA phase 1 diagnostics, the ICA test fails if it is run before completion of phase 1 diagnostics.

2. If you are starting out from the console main menu, key in the following sequence to select the ICA test:

M	to select Maintenance from the main menu
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
D	to select Diagnostics
S	to select Subsystem tests
I	to select the ICA Test

3. When the ICA Diagnostic Options menu shown below appears, type **E** to select the Enter Parameters menu.

```
ICA DIAGNOSTIC OPTIONS

Run Diagnostic
Enter Parameters
Select Deadstart PPU
Continue Monitoring Diagnostic
```

4. Enter the channel number (normally channel 0 or 20) in word 0. If you are not sure of the channel number, check it out from the Specify Hardware Option menu.

Interpreting the Error Information in P and A Registers

The ICA test takes about 20 seconds to complete. If the test fails, the P register reflects the section of the diagnostic that failed and the A registers reflects the error information. The table below summarizes the meaning of the values of the P register.

Meaning of P Register Values

P Register Value (octal)	Part of the Diagnostics that Failed
4	Phase 1 of the onboard diagnostics
5	Read and write confidence check
6	Channel active timeout check
7	Phase 2 of the onboard diagnostics
10	Reading the EDST. The EDST is the EEPROM Diagnostic Status Table that contains fatal error information saved by the onboard diagnostics.
11	Reading the DST. The DST is a Diagnostic Status Table that contains nonfatal error information during diagnostics execution.
12	Clearing the EDST
13	Status reject read test
20	All diagnostics passed - no errors.

The following table summarizes the meaning of the values of the A register as well as the possible P register values. The third table indicates what maintenance action you should take for the given values of the A register.

Meaning of A Register Value

P Register (Octal)	A Register (Octal)	Meaning of A Register Value
20	0	All diagnostics passed - no errors.
4 - 11	4001	Function to ICA was rejected. PP timed out waiting for response.
4 - 11	4002	PP timed out waiting for ICA to clear busy bit in general status register.
4 - 11	4003	Data transfer across the channel set the channel error flag in the IOU.
5	4004	One or more of the interface confidence check words were incorrect in value.
10 or 12	4005	The EDST checksum was incorrect.
7	4006	The ICA onboard diagnostics sent an illegal command to the PP.
13	4007	The status reject read test failed (ICA2 only).
7	20000	Error occurred in module 2000 that tests the general status register.
	20001	Error occurred in module 2001 that tests the DMA error detection logic.
	20002	Error occurred in module 2002 that tests the transfer of a long message across the channel.
	20003	Error occurred in module 2003 that tests the transfer of a fragmented message across the channel.
	20004	Error occurred in module 2004 that tests the format error logic.
	20005	Error occurred in module 2005 that tests the input truncated error detection logic.
	20006	Error occurred in module 2006 that tests the PP overrun error detection logic.
	20007	Error occurred in module 2007 that does a contention test (ICA1) or tests the chaining logic (ICA2).
	20010	Error occurred in module 2008 that does a contention test (ICA2 only).
4 - 7	1???1?	The PP or the ICA out of seqence.
7	1???2?	The ICA hardware did not detect a forced error.
5 - 7	1???3?	The onboard diagnostics detected an error in the channel interface logic.
5 or 7	14??3?	A parity error occurred on a channel write operation.
4 - 7	1???4?	An error in the ICA.
4	1???6?	No power to the Ethernet transceiver.
4	1???7?	A failure was detected during the Ethernet transceiver testing.
4 - 11	??????	?????? is the value of the general status register when the failure occurred.

Maintenance Actions for A Register Values

A Register	Maintenance Action
4001 4002	1. Execute the board-level diagnostics on PP cluster 0 pak. If the ICA pak is connected to the second channel cluster (channel 20), execute the board-level diagnostics on PP cluster 2 pak. 2. Execute the board-level diagnostic on the channel pak. 3. Replace the ICA pak. 4. Replace the channel pak.
4003 4004 4006	1. Execute the board-level diagnostic on the channel pak. 2. Replace the ICA pak. 3. Replace the channel pak.
20000 through 20007	1. Replace the ICA pak. 2. Execute the board-level diagnostics on the channel pak. 3. Replace the channel pak. 4. Replace the ICA-to-channel cable.
1???1?	1. Replace the ICA pak. 2. Execute the board-level diagnostic on the PP cluster 0 pak. If the ICA pak is connected to the second channel cluster (channel 20), execute the board-level diagnostics on the PP cluster 2 pak.
1???2? 1???3? 1???4? 14??3?	1. Replace the ICA pak. 2. Execute the board-level diagnostic on the PP cluster 0 pak. If the ICA pak is connected to the second channel cluster (channel 20), execute the board-level diagnostics on the PP cluster 2 pak. 3. Execute the board level diagnostic on the channel pak. 4. Replace the ICA-to-channel cable.
1???6?	1. Check the fuse on the ICA pak. Replace the fuse if it has blown. 2. Replace the ICA pak.
1???7?	1. Replace the Ethernet transceiver. 2. Replace the bulkhead-to- transceiver cable. 3. Replace the ICA pak.
??????	The value of the ICA general status. Refer to the module, Interpreting ICA General Status, for details.

Running the Online Test and Examining HPA/VE Reports

In addition to Network Access Method/Virtual Environment (NAM/VE), you can detect or isolate hardware failures online in the integrated communications adapter by running the online DVS diagnostic COMCT and by examining the HPA/VE error incident report.

Online Communications Confidence Test

The communications confidence test (COMCT) is run under the control of Diagnostic Virtual System (DVS). The test verifies the communications path to a designated communication system such as CDCNET. The test exercises the communications software and hardware to detect intermittent hardware problems that may occur in the communications path. The test detects the problem in the communications path only and does not isolate failing hardware components the way the ICA error incident report does.

However, when all maintenance actions fail to fix the problem, you may want to replace all replaceable units along the communications path as the last resort. These replaceable units are: the peripheral processor pak, channel pak, channel-to-ICA cable, ICA-to-bulkhead cable, bulkhead-to-transceiver cable, and the transceiver box.

Running DVS Diagnostic COMCT

For reasons of security, you cannot execute the COMCT test from the system console. If you are an experienced user of DVS, you can load and execute COMCT using standard DVS commands and procedures from a terminal. Contact the system administrator to validate you as a user and give you maintenance access privilege.

ICA Error Incident Report

HPA/VE generates the ICA error incident report from the contents of the system engineering log where NOS/VE logs all ICA errors and usage information. If NOS/VE detects an ICA hardware failure, NOS/VE sets the ICA to the DOWN state to prevent it from further use and HPA/VE generates the error incident report. When the ICA has a rate of recovered errors that exceeds the threshold preset by HPA/VE, HPA/VE also generates an error incident report.

Examining the ICA Report

Access HPA/VE through CML/VE and display the ICA error incident report according to procedures in the section 5 modules, Accessing Maintenance Software Products by Way of CML/VE, and Displaying Error Incident Reports from HPA/VE. Examine the report for maintenance action. Refer to the following table that helps isolate the FRU.

FRU Isolation Guide

Most Recent Entry on the Detailed Section of the Report	Maintenance Actions
ICA MICROCODE DETECTED FAILURE ::::::::::::::::::: with a message indicates the cause of the error and the contents of the data and address registers.	1. Print the report before each maintenance activity. 2. Replace the ICA pak. 3. Return the report with the failed pak.
INTERMEDIATE xxxxxx ---------- or RECOVERED xxxxx = = = = = = where xxxxx is the operation being performed when the error occurred.	1. Print the report before each maintenance activity. 2. If the analysis section of the report displays ICA'S SQC ERROR RATE IS OUT OF CONTROL or DOWNED BY SYSTEM, replace the ICA pak. 3. Return the report with the ICA pak.
UNRECOVERED xxxxx ********* with message indicates the cause of the error, the PP and channel numbers, general status, and detailed status. where xxxxx is the operation being performed when the error occurred.	1. Print the report before any maintenance activity. 2. If bits 3 through 5 (symptom code) of general status word are not zero, take action according to the isolation table in the module, Interpreting the ICA General Status. 3. Replace successively the ICA, channel pak, PP pak, and ICA-to-channel cable.

The general status, shown as (GS) on the display, represents the 16-bit ICA general status register in hexadecimal. The symptom code is bits 3 through 5 of the 16-bit word. Take maintenance action according to the ICA Symptom Code Isolation Table in the module, Interpreting the ICA General Status.

Interpreting ICA General Status

The 16-bit general status word from the ICA, which may show up on the console screen under either the NOS/VE, NAM/VE, or HPA/VE report, has the following format and meanings:

ICA General Status

BIT	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	GE	CE	PE	IE		DA	SB	SB	SD	B	SC	SC	SC	RC	RC	RC

Bit	Meaning	
15	**GE**	General error.
14	**CE**	Channel error.
13	**PE**	PP error.
12	**I E**	ICA error.
10	**DA**	Data available.
9-8	**SB**	States bits. 0 indicates RESET, 1 indicates DIAGNOSTIC, 2 indicates IDLE, and 3 indicates OPERATIONAL.
7	**SD**	Send data.
6	**B**	Busy. When this bit is set, only the SB bits are valid.
5-3	**SC**	Symptom code. This code is valid if the busy bit is not set. Refer to the table opposite for FRU isolation.
2-0	**RC**	Reset code. This code indicates the reset is initiated in one of the following ways:

1 - Power on master clear

2 - PP master clear (during deadstart or channel master clear)

3 - Deadman timeout

4 - Master clear switch on the ICA pak

5 - RESET direct function

6 - Software (68010 microprocessor RESET instruction)

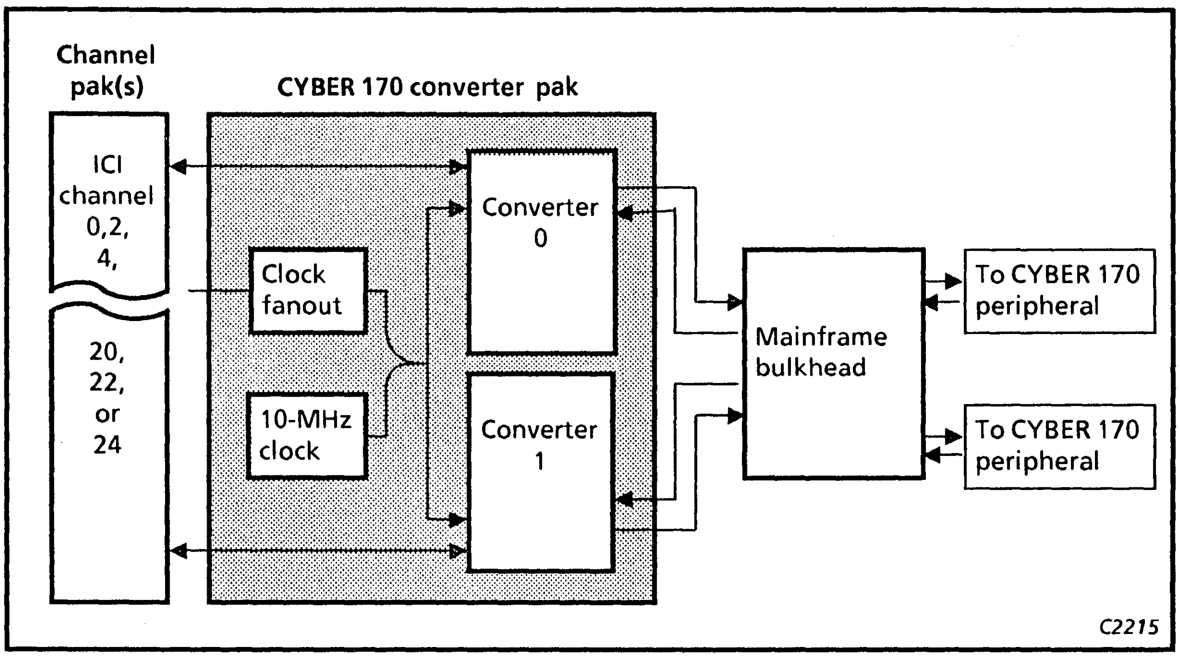
ICA Symptom Code Isolation Table

Symptom Code	Description	Maintenance Action
1	Unexpected transparent function	Replace the ICA pak.
2	Forced error not detected	Replace the ICA pak.
3	Channel interface failure	Replace the ICA pak.
4	ICA board failure	Replace the ICA pak.
6	No Ethernet transceiver power	Replace successively the ICA fuse (part 15185502), ICA, bulkhead-to-transceiver cable, ICA-to-bulkhead cable, and channel-to-ICA cable.
7	Ethernet transceiver failure	Replace successively the transceiver box, bulkhead-to-transceiver cable, and the ICA.

CYBER 170 Channel Converter

Peripherals that use the 12-bit CYBER channel interface can also be connected to the CYBER 930 system through an optional converter pak. Each pak contains two independent converters for converting the 12-bit channel interface to the 16-bit integrated controller interface (ICI) that the system uses. The following is an overview of the converter pak. To isolate errors on the converter pak, run the CYBER 170 channel converter test according to the procedure in the next module.

The converter pak consists of two independent channel converters. Each converter has one end connected to the mainframe cable bulkhead and the other to an ICI channel (channel 0, 2, 4, 20, 22, or 24) through an ICI cable. An external CYBER 170 channel converter cable set connects a peripheral to the mainframe cable bulkhead as shown in the following diagram.



Each converter gets its clocks from the common clock fanout circuitry on the pak. The converter pak also generates its own internal clock for the CYBER 170 interface and transmits a 10-MHz clock to the connected peripheral.

The converter supports the following CYBER 170 peripherals:

- Loosely Coupled Network (LCN) through the Network Access Device (NAD)
- Stornet Subsystem
- CYBER Unibus Interface (CIU)
- Mainframe Device Interface (MDI)

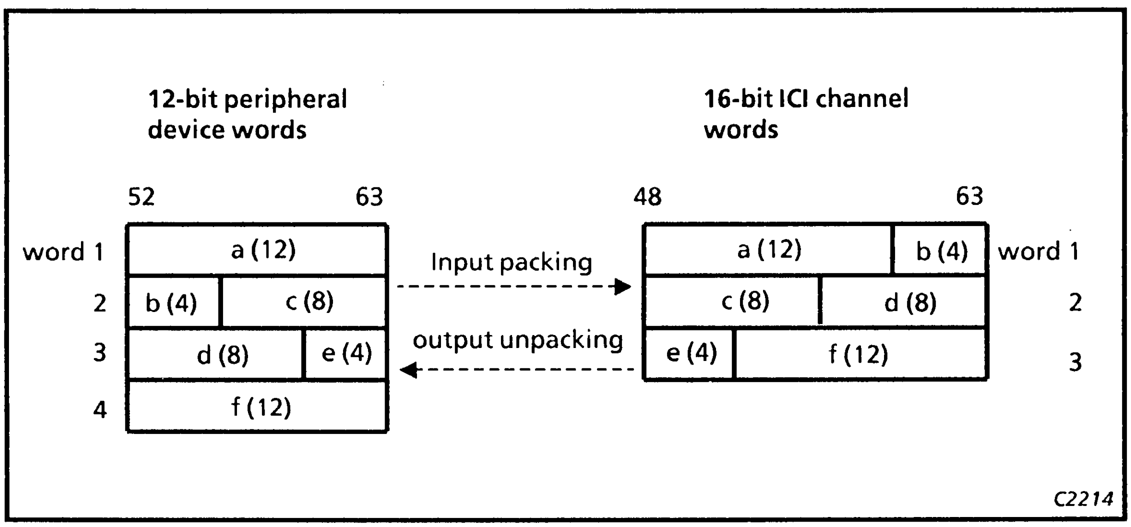
The converter provides two modes of data transfer: the 12-bit mode (straight through) and the conversion mode. Function code can select or deselect the converter. When you deselect the converter, it does not interfere with the operation of peripheral processor to peripheral processor transfers over the channel to which the converter is cabled.

Data Transfer in 12-Bit Mode

During a 12-bit input operation, the converter transmits bits 48 through 63 to the ICI channel. Bits 48 through 51 of the word, however, are zero filled. During a 12-bit output operation, the converter transmits bits 52 through 63 only of the ICI word to a connected peripheral. The converter ignores bits 48 through 51 of the ICI word.

Data Transfer in Conversion Mode

During a block input in conversion mode, the converter packs four successive 12-bit CYBER 170 words into three consecutive 16-bit ICI words. During a block output in conversion mode, the converter unpacks three successive 16-bit ICI words from the ICI channel into four consecutive 12-bit words before they are sent to the peripheral. The following diagram shows the packing and unpacking scheme.



Running the CYBER 170 Channel Converter Test

The CYBER 170 channel converter test isolates errors in the CYBER channel converter that is connected to a network access device (NAD) of the Loosely Coupled Network. Through the channel converter test, both CYBER 170 channels of the converter pak are checked on alternate passes.

How to Execute the CYBER 170 Channel Converter Test

NOTE

The CYBER channel converter test can execute only when the converter is connected to the NAD.

Because the test is run offline, you must terminate NOS/VE and return to console mode. The procedure below assumes that you start from the console main menu:

1. Key in the following sequence from the console main menu to select the 170 Channel Test:

M	to select Maintenance from the main menu
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
D	to select Diagnostics
S	to select Subsystem Tests
1	to select the 170 Channel Test

2. When the 170 Channel [Converter] Test Options menu shown below appears, type **E** to select the Enter Parameters menu.

```
170 CHANNEL TEST OPTIONS

Run Diagnostic
Enter Parameters
Select Deadstart PPU
Continue Monitoring Diagnostic
```

3. Enter the ICI channel number (usually channel 2) for converter 0 in word 0. If the second ICI channel number is within the same channel cluster (channel 0 or 4), enter it in word 1.

NOTE

If two NADs are connected to the converter pak and the second NAD is connected to the second channel cluster (channel 22 or 24), enter the same channel number of word 0 into parameter word 1.

If you are not sure of the channel numbers, check the Specify Hardware Options menu.

4. Press <**F3**> to save the entry and exit.

5. Type S to select the deadstart PPU. Enter any number between 00 and 04.

6. Press <Return> and then **R** to run the channel test.

7. If you want to test the 170 channel on the second channel cluster, rerun the test but enter the second channel number in both parameter words 0 and 1. Make sure that the deadstart PPU is also changed to the range 20 through 24.

Interpreting the P and A Registers

The CYBER 170 channel converter test takes about 20 seconds to complete. If the test passes, the console returns to the Subsystem Test menu. If an error occurs, the P and the A register display stops cycling. If this does not occur after 30 seconds of execution, the peripheral processor may be hung. Press <Esc> to stop the test. Before reexecuting the test, make sure that the parameters and deadstart PPU number are valid.

When the test detects an error, the P register shows a value of four and the A register shows an error code. The error code is interpreted as follows:

P = 4   A = ? ? ? ? ? ?

Channel number (first two digits)

Section number (third digit)

Subsection number (fourth digit)

Condition number (last two digits)

Maintenance Action

1. Record the contents of the P and A registers.

2. Replace successively the following units:
   - CYBER 170 channel converter pak
   - 170 channel-to-bulkhead cable
   - Converter-to- ICI channel cable

SECTION 3

ASSEMBLY REPLACEMENT AND REPAIR VERIFICATION

Replacing an Assembly

While replacing and removing any computer component you must

- Turn the power off;
- Follow safe practices;
- Control electrostatic discharge from circuit boards;
- Use the right tools and replacement parts;
- Know the procedure for powering the computer system on and off.

Ensure Power Is Set to OFF

Power must be set to OFF when replacing an assembly. Except for the tape cabinet from which you unplug the power cord, set the service switch on each of the other cabinets to disable power to each cabinet. However, when you replace an assembly such as the AC distribution rack, power supply, or battery backup, always power down the whole system from the system console.

Follow Safe Practices

All maintenance personnel should take reasonable safety precautions against electrical, mechanical, and personal hazards when working on the computer site. Read the Safe Use and Operation of the CYBER 930 [Control Data publication 60469007] to become familiar with the safety precautions.

Pay attention to all entries in the maintenance documentation and on the cabinets labelled CAUTION or WARNING. These labels identify hazardous areas or procedures you will encounter in the maintenance of system equipment:

Above all, use good judgement and common sense. A moment of thought before you act can save hours of agonizing afterthought. Become familiar with the following guidelines and apply them when working on the equipment:

- Remove personal jewelry, for example, rings, wristwatches, bracelets, and neckties;
- Wear an antistatic coat;
- Place removed doors and covers where they cannot be tripped over or otherwise cause injury;
- When lifting, be realistic about your ability. Always call for help when needed.

Control Electrostatic Discharge

All logic boards and some other components are highly sensitive to electrostatic discharge (ESD). You must take the ESD control precaution to prevent damage to metal-oxide semiconductor (MOS) components. Do not skip any of the ESD control steps in this section when you handle logic boards or assemblies.

Use the Right Replacement Part

Using the right replacement part for each maintenance task saves time and energy. Ensure that you bring the right maintenance kit or field replaceable unit. Assembly names and part numbers in the maintenance kits are listed in section 4.

Powering the System On and Off

The procedure for powering the system on and off is in section 1. Become familiar with this procedure to save time and to handle and protect the computer system properly.

Opening and Removing the Cabinet Doors

Opening, closing, and removing the cabinet doors are part of most removal and replacement procedures. These steps are left out of the procedures to avoid unnecessary repetition of text.

The rear door features a locking mechanism that requires a 4-mm (5/32-in) hexdriver or hex key to lock or unlock the door. The front door requires a key to lock or unlock it. You can open and remove the front and rear cabinet doors as follows:

- To unlock and open the front cabinet door, get the cabinet key from the customer. Turn the key clockwise to open the door. If you need to remove the door, lift it out of the door hinges.
- To unlock and remove the rear cabinet door:

    1. Insert a 4-mm (5/32-in) hexdriver or hex key in the latch lock and turn the hexdriver or hex key counterclockwise.
    2. Tilt the door back and pull the door ground strap out at the right side of the frame of the cabinet.
    3. Lift the door to remove it from the cabinet.

Mainframe Procedures - Quick Reference Table

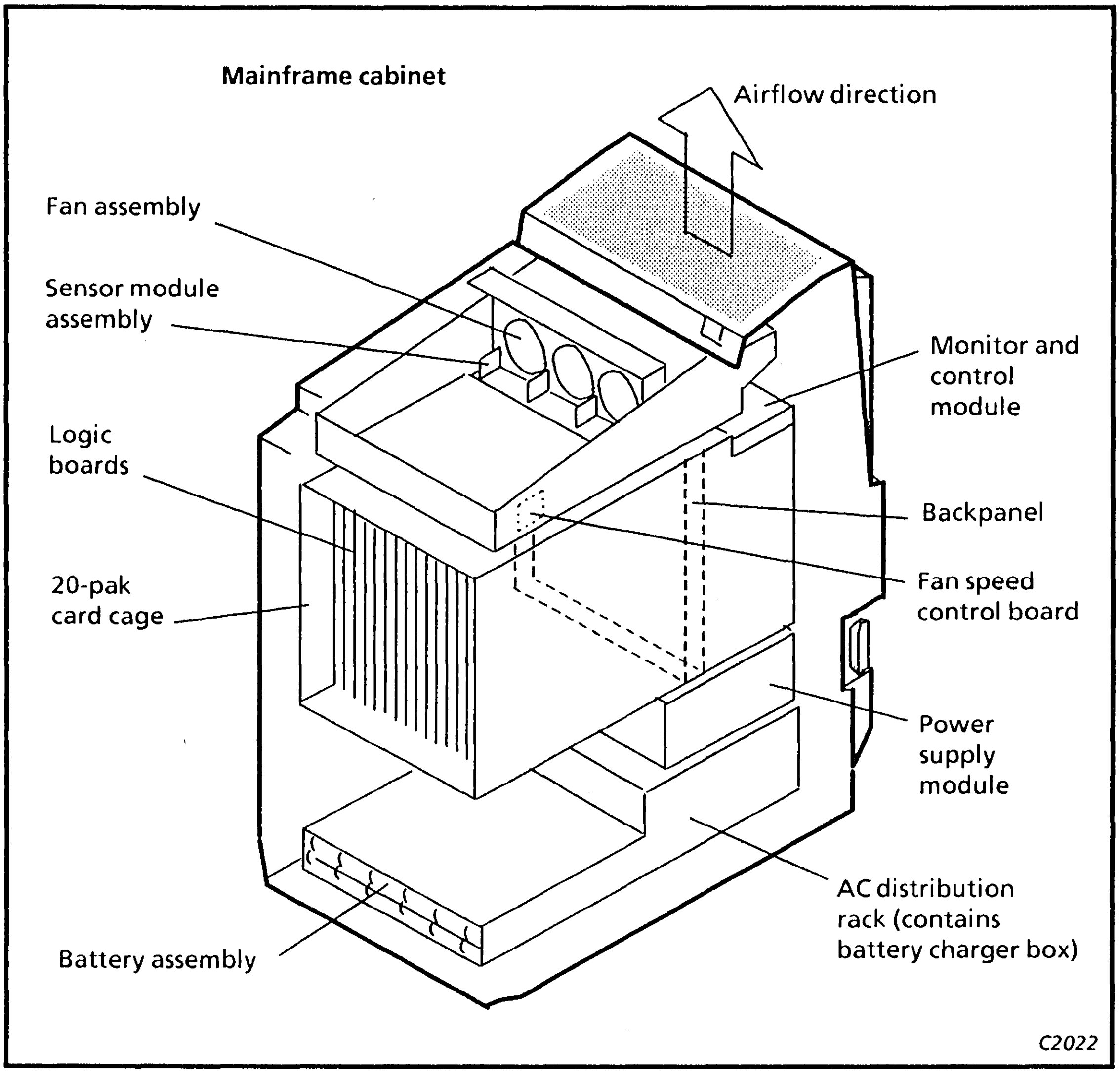
The mainframe procedures are for assemblies or components in the mainframe cabinet shown in the figure on the opposite page. The procedures listed below are in the order in which you will find them in this book.

WARNING

Deviation from these procedures may result in injury or equipment damage. The procedures have been verified by being performed on the equipment under controlled conditions.

Assembly	Procedure Number
Logic paks	1
Card cage and backpanel	2
Fan assembly	3
Fan Speed Control Board	3.1
Sensor module assembly	4
Mainframe control panel assembly	5
Monitor and control module	6
AC distribution rack	7
Power supply assembly	8
Battery assembly	9
Battery charger box	10
Cables and connectors	11
Air filter	17

Replaceable Assemblies and Components in Mainframe Cabinet



Procedure 1 - Logic Paks

The logic paks are accessible from the front of the mainframe cabinet. Each logic board contains many circuits and very large scale integrated - high density (VLSI-HD) chips that are sensitive to electrostatic discharge (ESD). Therefore, while replacing logic boards, apply ESD control. The following removal and replacement procedures are the same for each pak. Refer to the logic pak map for the location of the pak you want to replace.

Tools required: wrist strap and antistatic bag.

Replacement and Verification

1. Power down the mainframe from the system console. Set the service switch from SYSTEM to OFF.

2. Put your wrist strap on and clip it to the metal door hinge on the mainframe chassis.

3. Refer to the chassis location of either the 930 or 932 mainframe shown in the next two figures. Remove the pak you want to replace from the card cage as follows:

   a. Release the pak from the card-cage connector by pulling outward on the pak extractors shown in the illustration.

      If the replacement pak is 930 or 932 mainframe CPU pak A or B, remove CPU paks A and B as one unit. They are mounted together. **When you install paks A and B, make sure that the KK or DK pak is on the left side and that the KJ or DJ pak with notches on the edge is on the right side.**

   b. Remove the pak by sliding it straight out of its slot. Be careful not to touch any connector pins at the end portion of the pak.

4. Place the pak in a protective antistatic bag.

5. Remove the replacement pak from an antistatic bag.

   If the replacement pak is MAC/TPM or ICA, make sure you set the three-position toggle switch on it to the middle position.

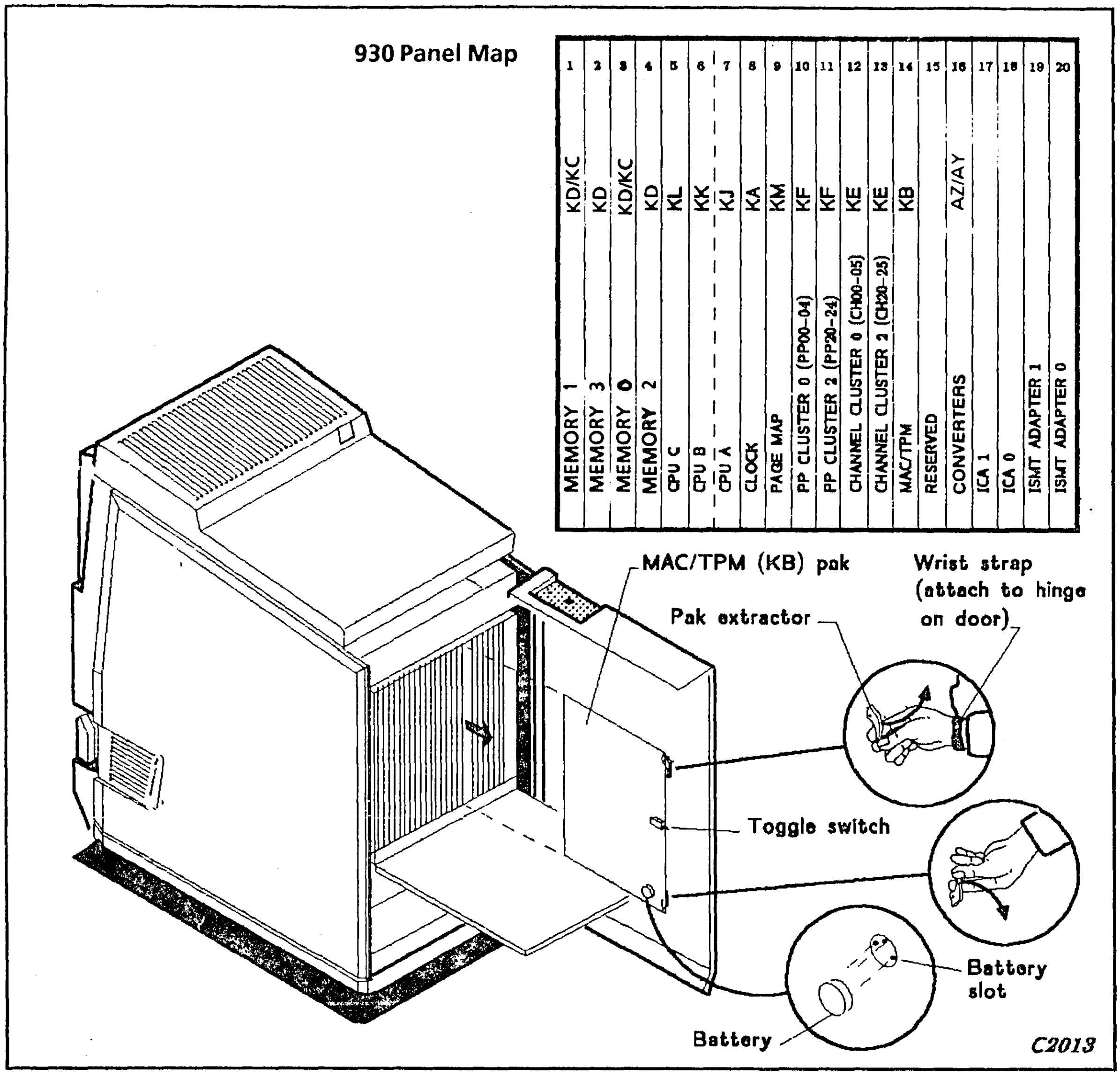
   The MAC/TPM replacement pak comes with a battery in a separate bag. Before step 6, install the battery to the pak. See the figure opposite for the battery location on the pak. If the MAC/TPM pak should become a spare part, remove the battery from the pak but stock the battery and the pak as one unit.

If the replacement pak is KC memory pak, make sure that you take the following precaution before step 6.

CAUTION

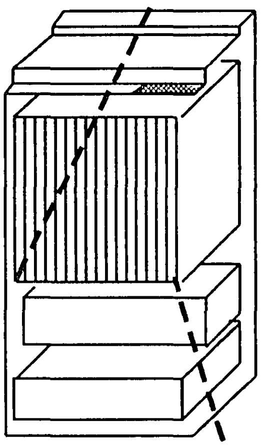
Identify the pak to the left of the KC pak. Loosen the identified pak by pulling outward on its pak extractors. This step prevents any damage that may cause by rubbing the chips on the KC pak against the pak extractors when you insert the KC pak.

Chassis Location of 930 Mainframe Logic Paks



1	KD/KC	MEMORY 1
2	KD	MEMORY 3
3	KD/KC	MEMORY 0
4	KD	MEMORY 2
5	KL	CPU C
6	KK	CPU B
7	KJ	CPU A
8	KA	CLOCK
9	KM	PAGE MAP
10	KF	PP CLUSTER 0 (PP00–04)
11	KF	PP CLUSTER 2 (PP20–24)
12	KE	CHANNEL CLUSTER 0 (CH00–05)
13	KE	CHANNEL CLUSTER 2 (CH20–25)
14	KB	MAC/TPM
15		RESERVED
16	AZ/AY	CONVERTERS
17		ICA 1
18		ICA 0
19		ISMT ADAPTER 1
20		ISMT ADAPTER 0

Chassis Location of 932 Mainframe Logic Paks



932 Mainframe Panel Map

1	CPU0-B	DK
2	CPU0-A	DJ
3	CPU1-B	DK
4	CPU1-A	DJ
5	CLOCK	DA
6	MEMORY 2	KD
7	MEMORY 0	KD/KC
8	MEMORY 3	KD
9	MEMORY 1	KD/KC
10	PAGE MAP	DM
11	PP CLUSTER 0 (PP00-04)	KF
12	PP CLUSTER 2 (PP20-24)	KF
13	CHANNEL CLUSTER 0 (CH00-05)	DE
14	CHANNEL CLUSTER 2 (CH20-25)	DE
15	TPM/MAC	KB
16	CONVERTERS	AZ/AY
17	ICA 1	
18	ICA 0	
19	ISMT ADAPTER 1	
20	ISMT ADAPTER 0	

C2001

6. With the component side on your left, insert the pak into the slot and push toward the back until you encounter resistance.

CAUTION

In the next step, do not exert undue pressure when seating the pak in the card cage. If the pak does not seat properly, realign it and try again.

7. Carefully seat the pak in the card-cage connector with equal thumb pressure on the top and bottom pak extractors.

8. Remove the ground connector of the wrist strap from the mainframe chassis unless you must continue to use this strap.

9. Verify repair by running board-level diagnostics or subsystem tests.

   If the replacement pak is the ISMT adapter, run the CIP tape tests. If the replacement pak is ICA, run the ICA subsystem test.

   NOTE

   ICA-2 pak takes about 1 minute to complete the power-on-master-clear sequence when the mainframe is powered on. If you need to verify ICA-2 pak, wait 1 minute before running the ICA test.

10. Generate an engineering report. See section 4 for the procedure.

Procedure 2 - Card Cage and Backpanel

The printed circuit backpanel that interconnects the logic paks is in the back of the card-cage assembly. Because of the work and time involved in removing interconnections between the backpanel and the card-cage assembly, you should instead replace the card-cage assembly for any diagnostic calls for a backpanel replacement. Because you must remove all logic paks in the card-cage assembly, pay special attention to electrostatic discharge control for the logic paks and their locations in the card cage.

Tools required: wrist strap, antistatic bags, torque wrench with 0.75-in deep socket, and labeling tape.

NOTE

If you suspect that the fault is the cable drop between the backpanel and the bulkhead, contact Technical Support for instructions or check out the cable. If the cable or the connection is faulty, there is no need to replace the card cage.

If you have an assistant to help you, either you or the assistant can perform steps 8 through 13 in parallel with steps 3 through 7.

Replacement

1. Power off the mainframe cabinet from the console.

2. Set the main breaker and the service switch to OFF. If the mainframe has a battery backup unit, set the circuit breaker on the battery charger box to OFF.

3. Open the front door and disconnect the two cable connectors that lead to the emergency OFF switch and AC ON indicator (mainframe control panel) shown in the figure opposite.

4. Remove the front door by lifting the front door to disengage it from the hinges.

5. Put the wrist strap on and connect it to the ground connection on the mainframe chassis.

6. Remove the air damper at the front panel of the card cage by removing its four mounting screws.

7. Open the front panel of the card cage and remove all paks from the card cage and put them in antistatic bags one at a time. If you need detailed removal and replacement procedures for a logic pak, refer to Procedure 1 - Logic Paks.

8. Remove the eight mounting screws, four from each side of the mounting rack.

9. Verify that no tie-wrap holders are attached to the card cage as follows:

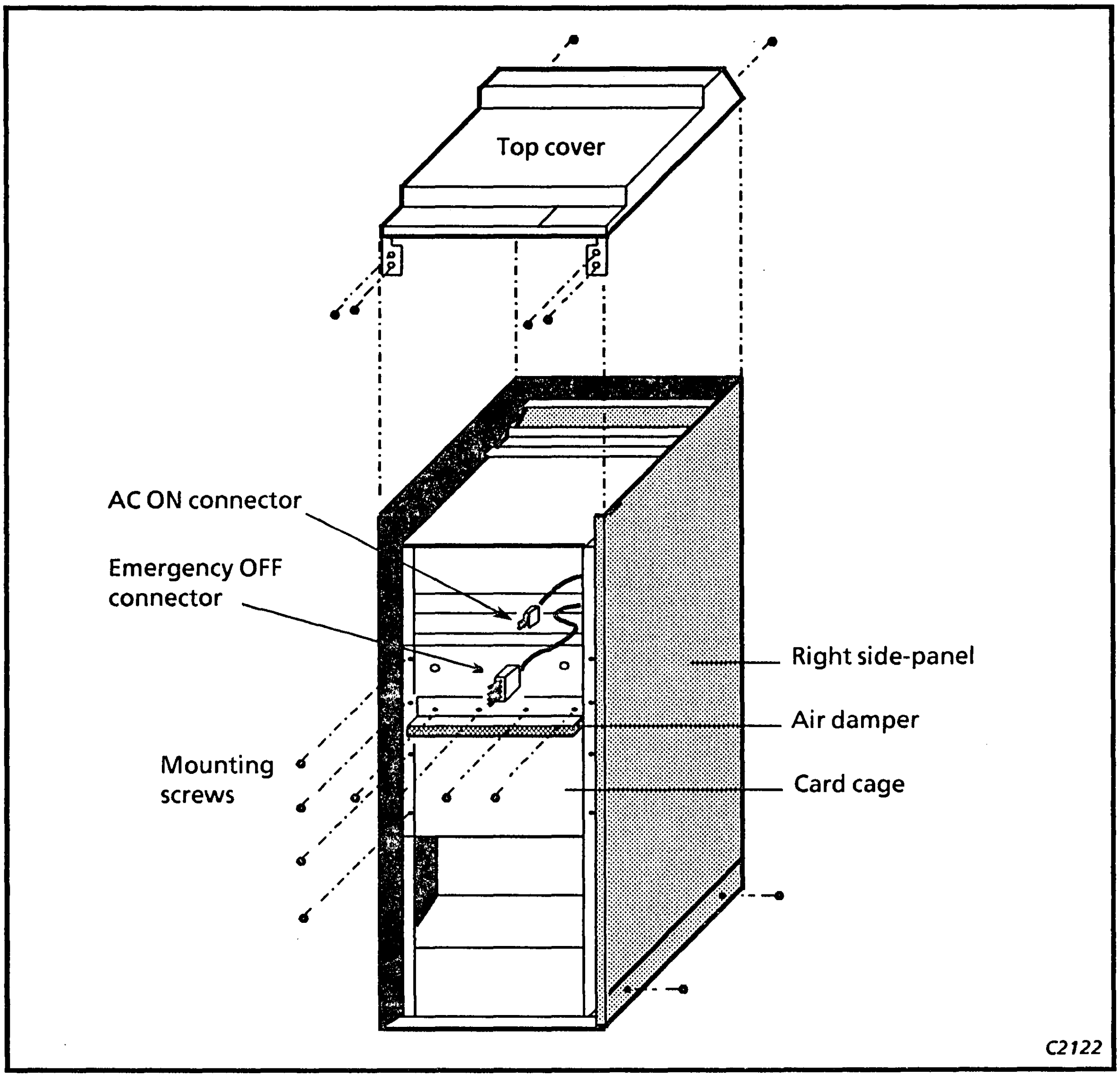
    a. Remove the top cover by removing the six holding screws.

    b. Remove the two holding screws at the bottom of the right side-panel.

    c. Remove the right side-panel.

    d. If there are tie-wrap holders attached to the card cage, cut them and remove the holders to clear the path.

Card-Cage Assembly (Front View)



10. At the back of the card cage, disconnect all cables from the bulkhead and label them with labeling tape for easy reconnection later on. The ICA cable connectors each have a latch. To remove this kind of connector, disengage the latch by using a screwdriver to push the latch from left to right.

11. Remove the protective metal cover for the power bars at the lower portion of the bulkhead by removing the four holding screws.

12. Remove the power supply mounting screws to remove the protective cover of the power supply.

13. Disconnect the MCM-to-card-cage cable from the lower left of the card cage.

14. Use a 3/4-in deep socket wrench to remove the holding nuts on the power supply and card cage so that you can remove the two power bus bars.

CAUTION

When you replace the bus bars, preset the torque wrench to 15 nm/rad (11 lbf.ft) for tightening the nuts on two terminals of the power supply, 24.4 nm/rad (18 lbf·ft) for tightening the nut on the card cage terminal with a line filter, and 33.9 nm/rad (25 lbf·ft) for tightening the nut on the other terminal. You need an additional wrench to hold the inner nut on the line filter terminal while you tighten the outer nut with the preset wrench.

15. Open the bulkhead panel by turning the two latches anticlockwise.

16. Remove the eight mounting screws, four from each side wall of the card cage as shown in the figure.

WARNING

Two persons are needed to take the card cage out. The card cage is back-heavy. Take care in removing it from the cabinet in your next step.

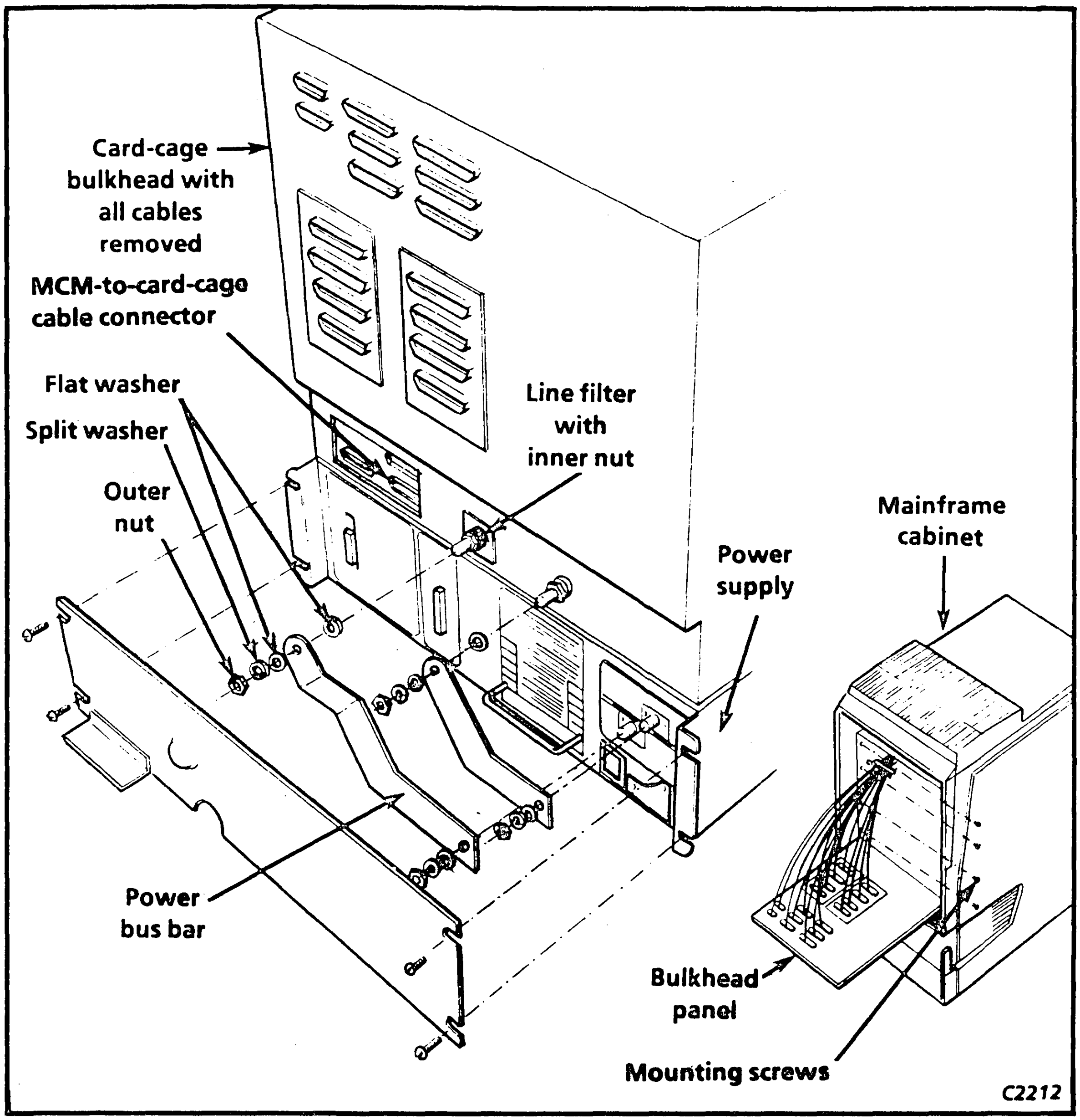
17. Remove the card cage by pushing it to the front of the cabinet.

18. Install the replacement card cage by reversing steps 1 through 17.

19. Execute the offline mainframe diagnostics.

20. Initiate NOS/VE and execute the system validation suite according to the procedure in section 5.

Card-Cage Assembly (Rear View)



Procedure 3 - Fan Assembly

The cooling fan assembly in the mainframe cabinet provides forced-air cooling of the logic paks. The assembly, mounted above the card-cage assembly, is accessible from the top of the cabinet.

Replacement

1. Power off the cabinet from the console.

2. Set the main circuit breaker to OFF.

WARNING

If the mainframe has a battery backup option, set the circuit breaker on the battery charger box to OFF and disconnect the output power cable from it. After replacing the assembly but before powering on the cabinet, reconnect the cables and set the circuit breaker to ON.

3. Open the front door of the cabinet.

4. Remove the top cover of the cabinet by removing the six holding screws shown in the figure.

5. Remove the fan cover by removing the six holding screws.

6. Check that a fan speed control board is in front of the fan casing on the right as shown in the figure opposite.

   If there is a fan speed control board, disconnect the cable assembly that connected the fan and fan speed control board with the monitor and control module. Go to step 9.

7. Remove the right side-panel by removing the two holding screws on the bottom of the panel and lifting the panel out of its slot.

8. Disconnect the power cable of the fan assembly from J2 of the junction box.

9. Remove the mounting screws to disconnect the four sensor assemblies.

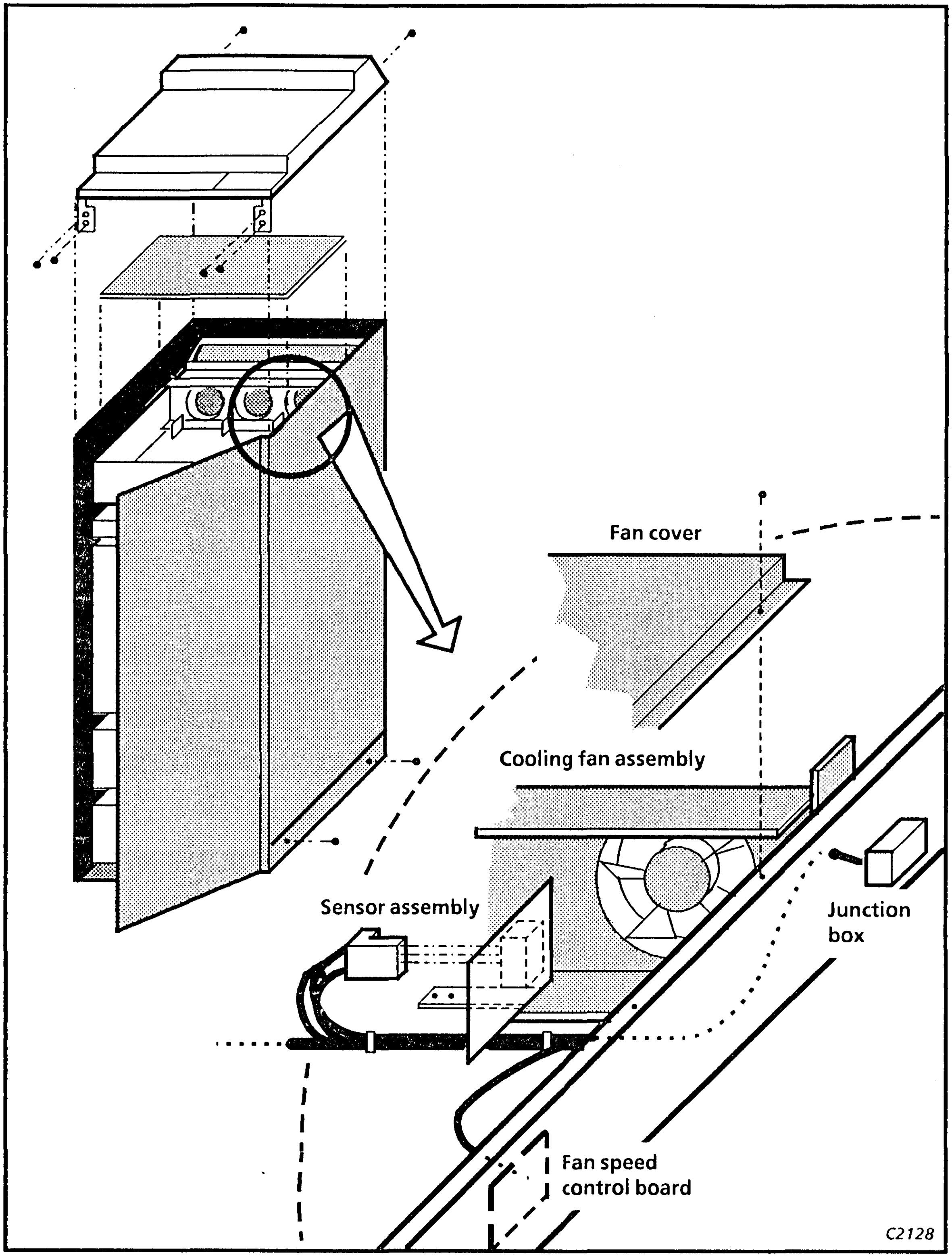
10. Remove the four holding screws to remove the fan assembly from the assembly bracket.

11. Reverse steps 1 through 10 to install the replacement unit.

12. Verify that the fans are operating and the system comes on.

13. Check the indicators on the monitor and control module. The TEMP 1 through 4, O/R, and fan indicators should not light. If any one of these indicators lights, check the associated cable connection on the fan assembly or sensor assembly.

Fan Assembly



Procedure 3.1 - Fan Speed Control Board

The fan speed control board automatically adjusts fan speed to maintain constant temperature against changes in room temperature, power dissipation, air flow resistance, and atmospheric pressure. You can access the board, which is mounted above the card-cage assembly, from the top of the cabinet.

Replacement

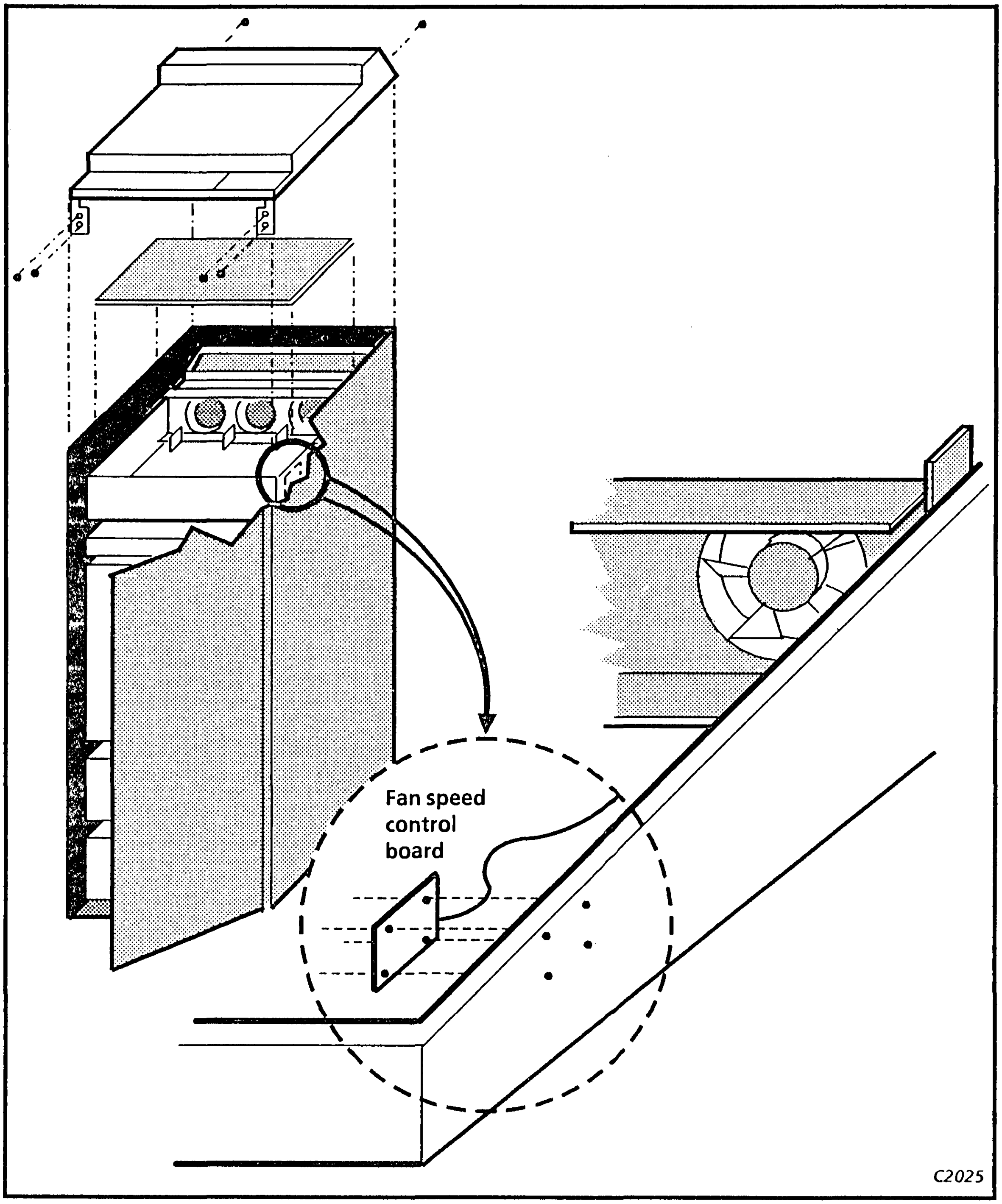
1. Power off the cabinet from the console.
2. Set the main circuit breaker to OFF.

WARNING

> If the mainframe has a battery backup option, set the circuit breaker on the battery charger box to OFF and disconnect the output power cable from it. After replacing the assembly but before powering on the cabinet, reconnect the cables and set the circuit breaker to ON.

3. Open the front door of the cabinet.
4. Remove the top cover of the cabinet by removing the six holding screws shown in the figure.
5. Remove the fan cover by removing the six holding screws.
6. Disconnect the four-contact connector cable from the fan speed control board to the fan assembly.
7. Remove the mounting screws to disconnect the board from its standoff.
8. Reverse steps 1 through 7 to install the replacement unit.
9. Verify that the fans are operating and the system comes on.
10. Check the indicators on the monitor and control module. The TEMP 1 through 4, O/R, and fan indicators should not light. If any one of these indicators lights, check the associated cable connection on the fan assembly or sensor assembly.

Fan Speed Control Board



Procedure 4 - Sensor Module Assembly

The sensors monitor the temperature of the cooling system in the mainframe cabinet. Sensors in the fan assembly are shown in the diagram. Replace the sensor assembly according to the following procedure.

NOTE

Viewed from the front of the mainframe, the four temperature sensors are TEMP 1, 2, 3, and 4 from left to right.

Replacement

1. Power off the cabinet from the console.

2. Set the main circuit breaker to OFF.

WARNING

If the mainframe has a battery backup option, set the circuit breaker on the battery charger box to OFF and disconnect the output power cable from it. After replacing the assembly but before powering on the cabinet, reconnect the cables and set the circuit breaker to ON.

3. Open the front door of the cabinet.

4. Remove the six holding screws to remove the top cover of the cabinet shown in the figure in procedure 3.

5. Remove the fan cover by removing the six holding screws.

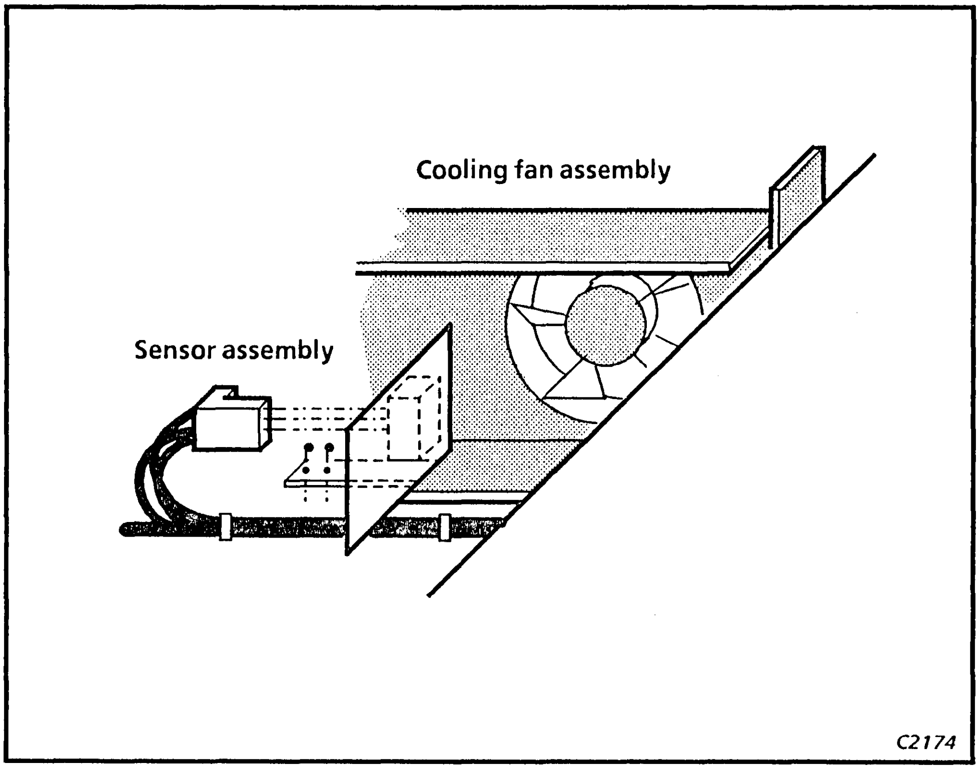
6. Disconnect the power cable connection from the sensor assembly.

7. Remove the sensor assembly from the assembly bracket by removing the holding screws.

8. Install the replacement unit by reversing steps 1 through 6.

9. Check the indicators on the monitor and control module. The TEMP 1 through 4 and O/R indicators should not light. If they light, recheck the cable connections.

Sensor Module Assembly



Procedure 5 - Mainframe Control Panel Assembly

On the mainframe control panel is an emergency stop button that powers the system off completely and instantaneously. The mainframe control panel also shows the power status of the mainframe cabinet.

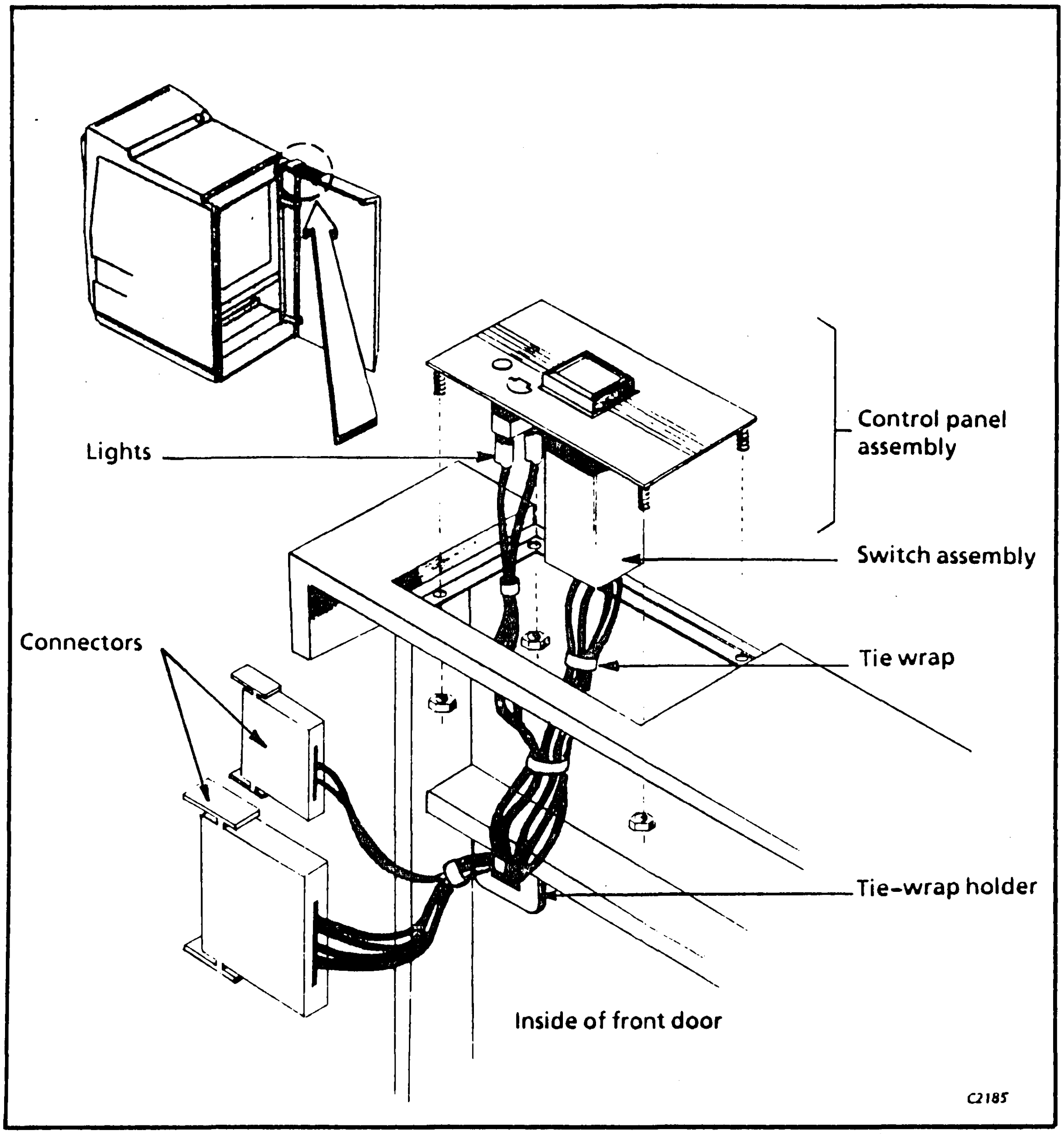
Replacement

1. Power off the cabinet from the system console.
2. Set the main circuit breaker to OFF. If the mainframe is equipped with the battery backup option, set the circuit breaker on the charger box to OFF.
3. Open the front door of the cabinet and remove the four locknuts that hold the mainframe control panel assembly to the front door.
4. Detach the cables from the mainframe control panel assembly and lift it out.
5. Install the replacement assembly by reversing steps 2 through 4.
6. Ensure the service switch is set to SYSTEM.

Verification

1. Power on the system from the system console.
2. Verify that the control panel light is on.
3. Press the emergency OFF button. Verify that the main circuit breakers of all the cabinets trip to OFF.
4. Reset all breakers to ON.
5. Power on the system from the system console.

Mainframe Control Panel Assembly



Procedure 6 - Monitor and Control Module

The monitor and control module (MCM) monitors the environmental and power status of the mainframe cabinet. Set power to OFF before replacement.

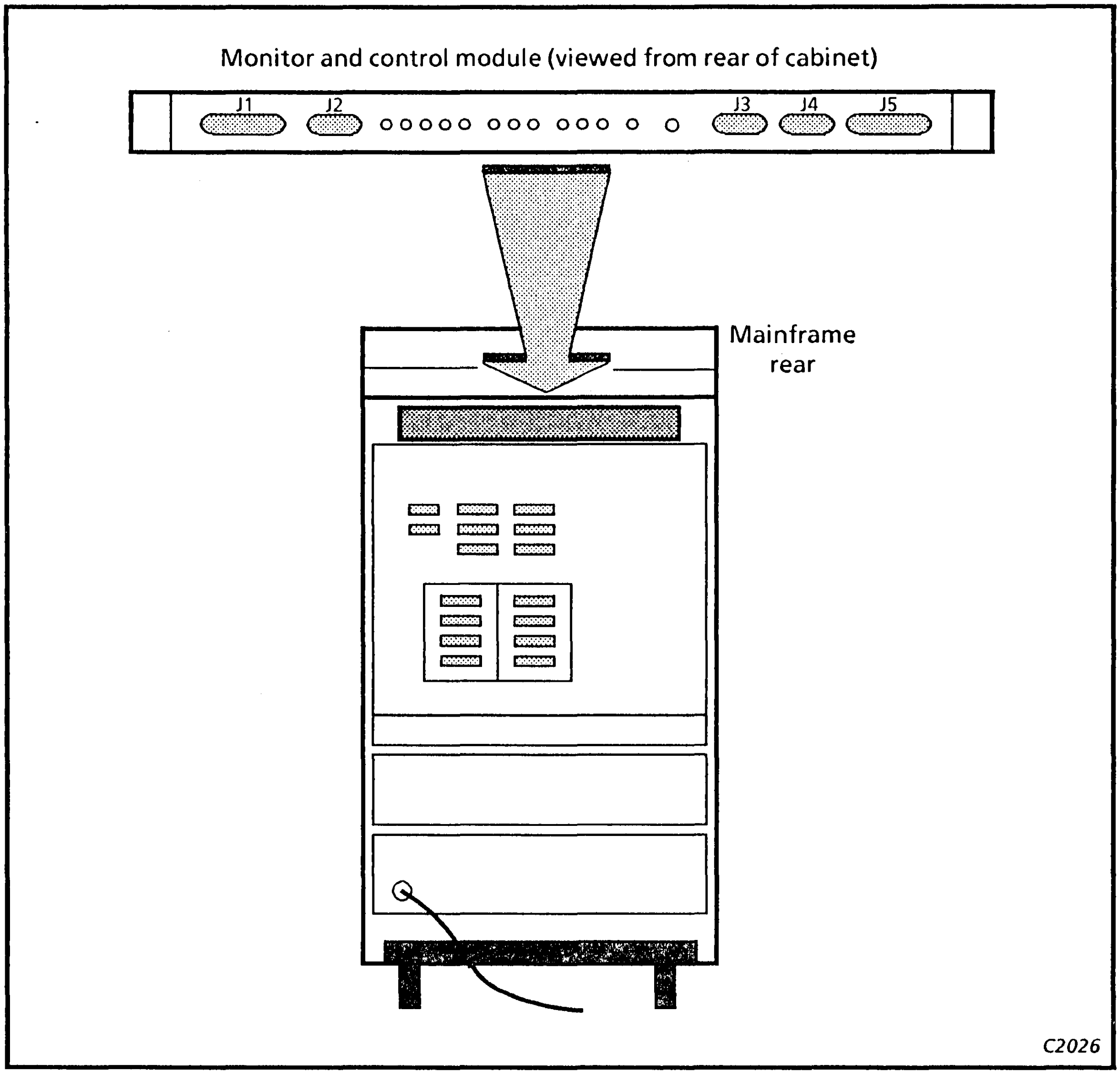
Replacement

1. Power off the mainframe cabinet from the console.
2. Set the main circuit breaker to OFF and the service switch from SYSTEM to OFF. If the battery backup option is installed, set the circuit breaker on the charger box to OFF.
3. Disconnect all cable harnesses (J1 through J5) from the MCM. Connectors at J1 and J5 have a latch. To remove this connector, disengage the latch by using a screwdriver to push the latch from left to right.
4. Remove the four mounting screws and take the MCM out.
5. Insert the replacement MCM in the slot. Make sure that the rear of the MCM is seated firmly in the MCM support bracket.
6. Secure the MCM by reinstalling the mounting screws.
7. Reconnect all cable harnesses.
8. Reset the service switch to SYSTEM, the main circuit breaker and the charger breaker to ON.

Verification

1. Power on the mainframe from the console.
2. Verify that the REMOTE PWR ON indicator on the MCM is on and that all other indicators are off.
3. Press and hold the RESET LED TEST button on the MCM. All indicators should light.
4. Release the RESET button. The REMOTE PWR ON indicator remains on; all other indicators go off.

Monitor and Control Module



Procedure 7 - AC Distribution Rack

The AC distribution rack, which contains the main circuit breakers and the service switch, protects power components in the mainframe cabinet. Use the following procedure to replace the rack.

Replacement

1. Power the system off from the console and set the main circuit breaker to OFF.

   WARNING

   If the mainframe has a battery backup option, set the circuit breaker on the battery charger box to OFF and disconnect the output power cable from it. After replacing the assembly but before powering on the cabinet, reconnect the cables and set the circuit breaker to ON.

2. Unplug the power cable from the wall outlet.

3. If battery option is installed, remove the battery packs and the charger box as follows:

   a. Open the front door, remove the protective cover from the AC distribution rack, and disconnect the cable connectors from all battery packs.

   b. Remove all battery packs.

   c. Disconnect DC output power cables from the charger box.

   d. Remove the four holding screws to remove the charger box.

4. Disconnect the cables and jumper from the AC distribution rack. If the AC distribution rack does not have the battery option, no jumper is at J8.

5. Remove mounting screws and pull out the AC distribution rack.

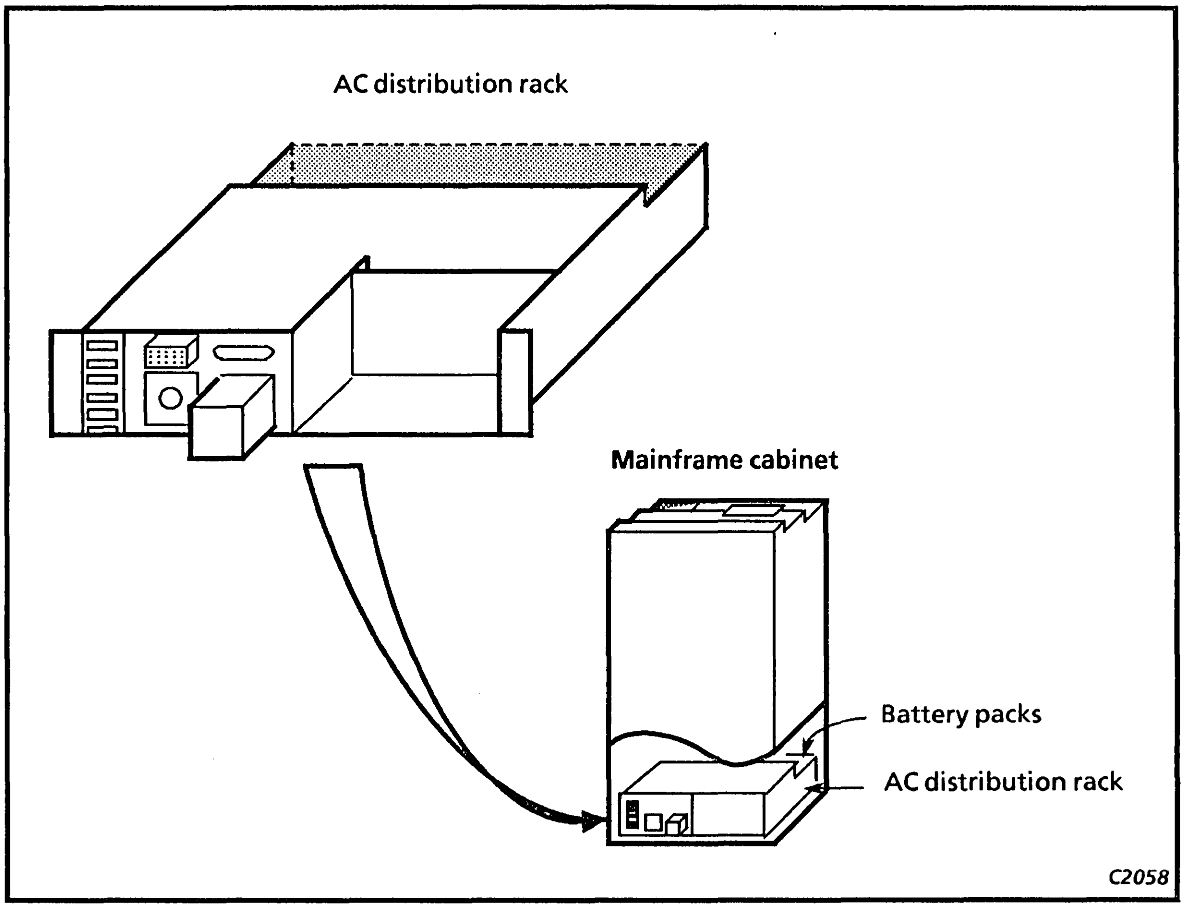
6. Install the replacement unit by reversing steps 1 through 5.

Verification

1. Observe the AC DROP indicator on the MCM. It should not light.

2. Verify that the battery backup is operating. Refer to procedure 10 for verification of the battery charger box.

AC Distribution Rack



Procedure 8 - Power Supply Assembly

The power supply assembly converts AC power from the AC distribution rack into the necessary DC voltages for the mainframe logic circuits. Because of the considerable weight and high voltage of the power supply module, perform replacement procedures with care and caution.

Tools required: torque wrench with a 3/4-inch deep socket.

Replacement

WARNING

If the mainframe has a battery backup option, set the circuit breaker on the battery charger box to OFF and disconnect the output power cable from it. After replacing the assembly but before powering on the cabinet, reconnect the cables and set the circuit breaker to ON.

1. Power down the system from the console.
2. Set the main circuit breaker to OFF, the charger breaker to OFF, and pull the AC power cord from the wall outlet.
3. Remove the power supply mounting screws to remove the protective cover of the power supply. If there is another protective cover above the power supply, remove the protective cover so that you can access the power bus bars on the card cage.
4. Wait three minutes before disconnecting the three cables and the white DC cable assembly on the power supply.
5. Remove cables from J5 through J7 on the AC distribution rack so that these cables are not in your way when you take out the power supply during a later step.
6. Use a torque wrench with a 3/4-in deep socket to remove the holding nuts on the power supply and card cage so that you can remove the two power bus bars.

CAUTION

When you replace the bus bars, preset the torque wrench to **15 nm/rad (11 lbf.ft)** for tightening the nuts on two terminals of the power supply, **24.4 nm/rad (18 lbf-ft)** for tightening the nut on the card cage terminal with a line filter, and **33.9 nm/rad (25 lbf-ft)** for tightening the nut on the other terminal. You need an additional wrench to hold the inner nut on the line filter terminal while you tighten the outer nut with the preset wrench.

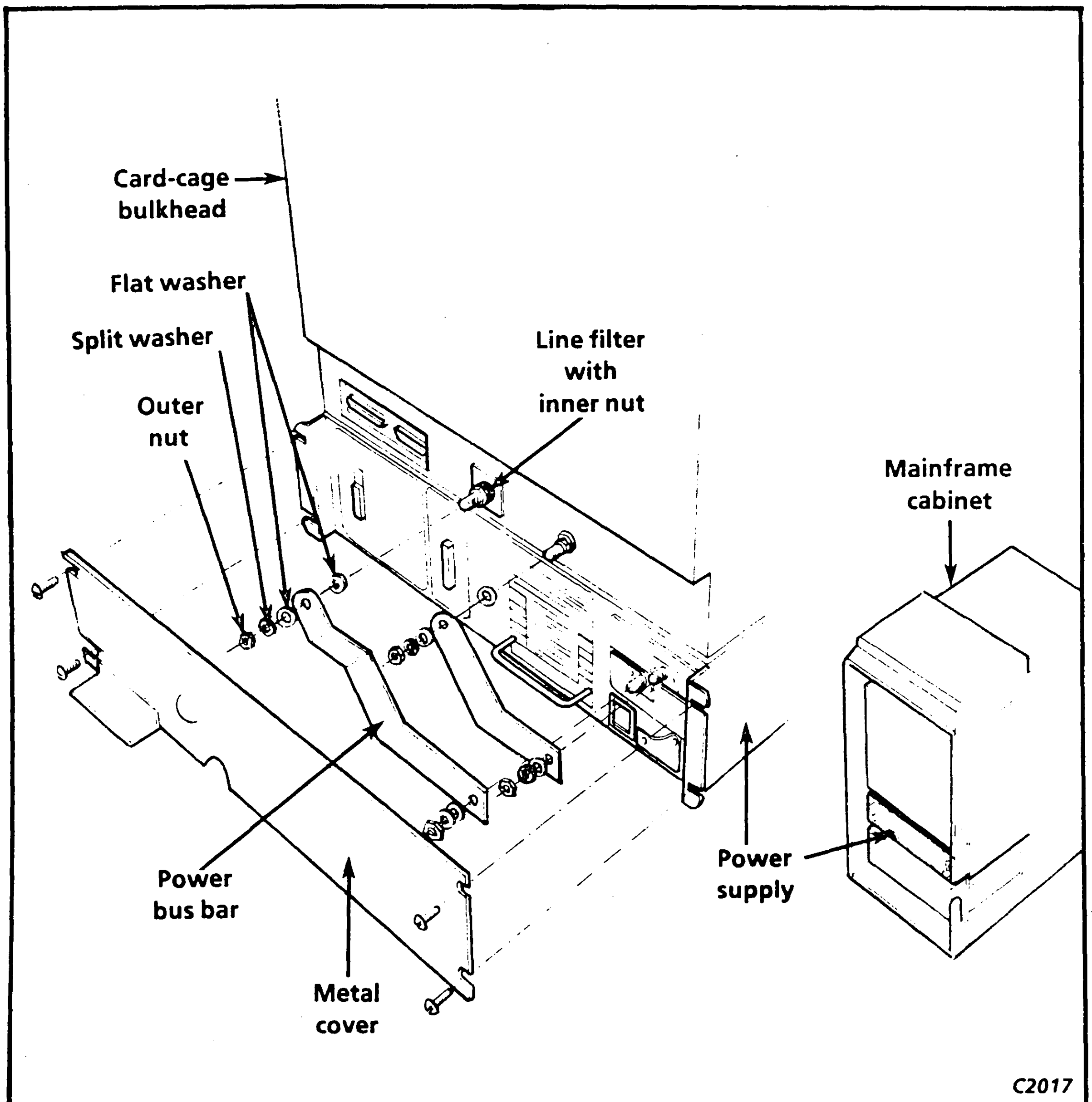
The power supply weighs close to 18 kg (40 lb). Always call for help when you need it in step 7.

7. Hold onto the handle and remove the power supply assembly.

8. When replacing the power bus bars, see the CAUTION above. Install the replacement unit by reversing steps 1 through 7. When you insert the power supply, make sure that you seat its rear firmly in the support bracket.

9. Verify that the OK and I>15A indicators on the power supply are lit, the PS indicator on the MCM does not light, and the fans are on.

Power Supply Assembly



Procedure 9 - Battery Assembly

The battery assembly and the battery charger box form the battery backup option in the mainframe. The battery assembly, which contains six packs totalling 120 cells of 2-V batteries, can maintain system power for up to two minutes during a power interruption. Refer to the figure and the procedures below to replace the battery assembly.

Replacement

1. Power off the system from the console.
2. Set the main circuit breaker to OFF and the circuit breaker on the battery box to OFF.
3. Open the front door of the cabinet and remove the front cover of the AC distribution rack.
4. Disconnect all battery plug connectors from their cable harnesses.

CAUTION

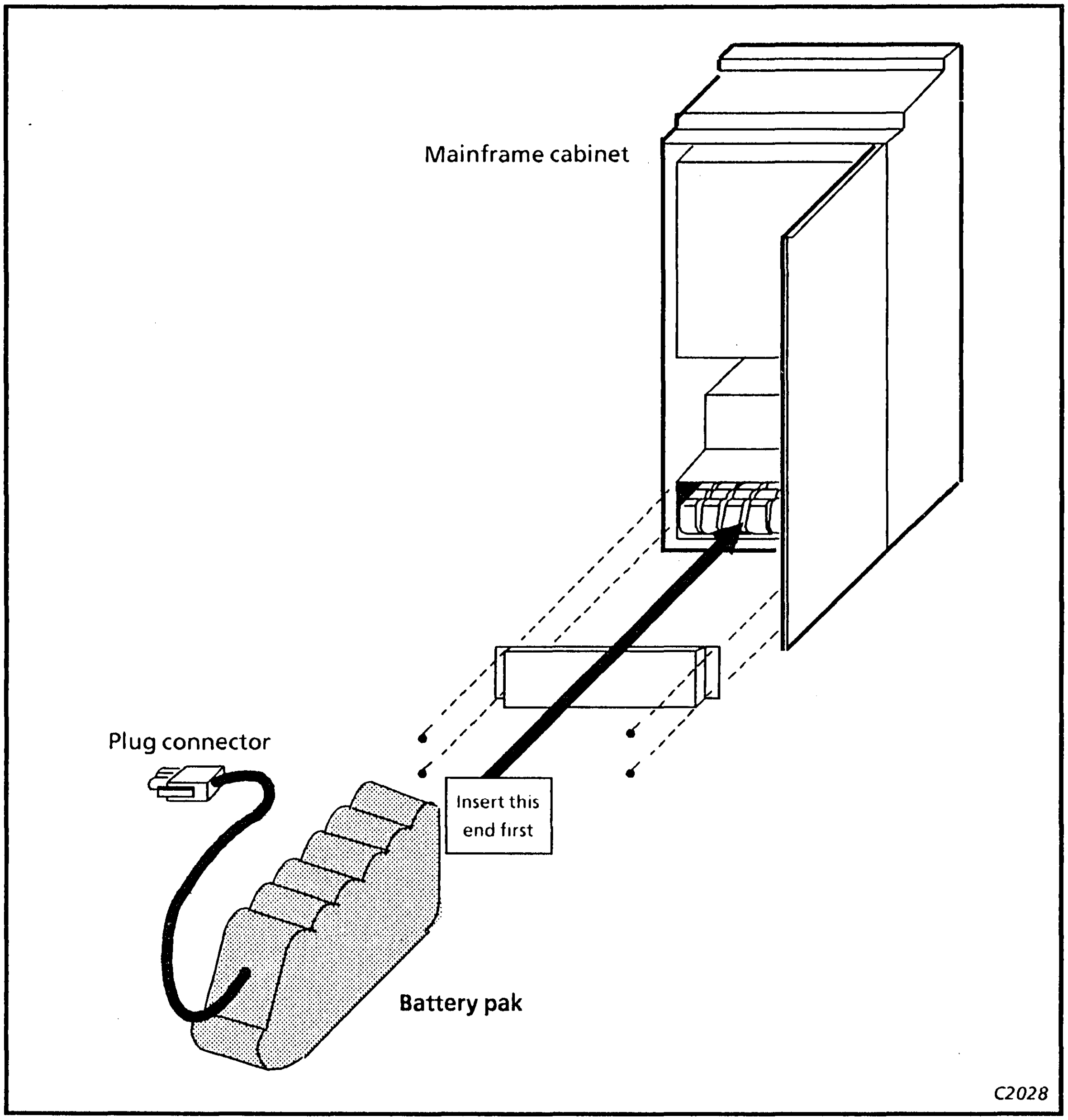
Each set of cable harnesses contains a temperature sensor. Do not damage the sensor during step 5.

5. Pull out the battery packs.
6. Install replacement packs by reversing steps 1 through 5.

Verification

1. Observe the battery status indicator on the monitor and control module. An unlit indicator means the battery is good. The BATTERY ON-LINE should not light. If the battery needs recharging, the BATTERY NOT AVAILABLE indicator lights.
2. Observe the battery status on the charger box. The AVAILABLE indicator should light but not flash. The CHARGER ON indicator can be either ON or OFF. The CHARGER OV and OT indicators should not light.

Battery Assembly



Procedure 10 - Battery Charger Box

The battery charger box and the battery assembly form the battery backup option in the mainframe. The charger box assembly provides the charging DC power that maintains system power for up to two minutes during power interruption. Refer to the figure and the procedures below to replace the charger box assembly.

Replacement

1. Power off the mainframe cabinet from the console.
2. Set the main circuit breaker to OFF and the circuit breaker on the battery charger box to OFF.
3. Open the front door, remove the protective cover from the AC distribution rack, and disconnect the cable connectors from all battery packs.
4. Disconnect the DC output power cable from the charger box.
5. Remove the mounting screws and pull out the charger box.

NOTE

The back of the battery charger box is connected to a spring-loaded connector in the AC distribution rack. Hold onto the large connector in front of the charger box and apply enough force to disengage the connector to pull the charger box out.

If you have difficulty removing the battery charger box, remove the whole AC distribution rack and take the rack cover off before removing the charger box.

6. Install the replacement unit in the AC rack by reversing steps 2 through 5.

Verification

1. Power on the mainframe cabinet from the console.
2. Observe the LED indicators on the charger box. The AVAILABLE ON LINE indicator should light but not flash. The CHARGER ON indicator can be either ON or OFF. The CHARGER OV and OT indicators should not light.

3. Observe the battery status indicator on the monitor and control module. The BATTERY ON LINE should not light. If the batteries need recharging the BATTERY NOT AVAILABLE indicator lights.

4. Take the following steps to verify the battery online operation.

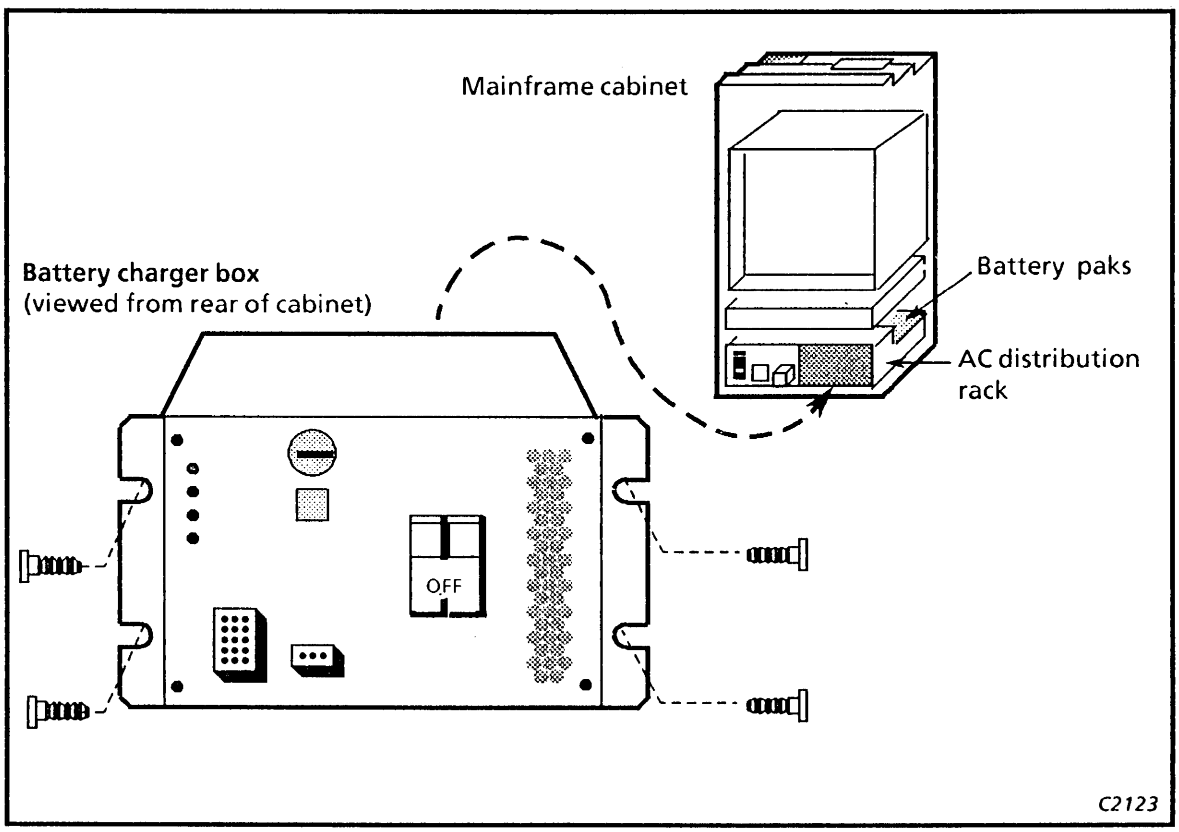
   a. Disconnect the AC Hubbell connector from the wall outlet and take a time count of 15 seconds.

   b. Verify the following:

      - The BATTERY ON LINE and AC DROP indicators on the monitor and control module are lit.
      - The AVAILABLE ON LINE indicator on the battery charger is flashing.
      - The mainframe power remains on.

   c. At the end of the 15 seconds, reconnect the AC hubbell connector to the power outlet.

Battery Charger Box



Procedure 11 - Cables and Connectors

Worn or loose connections in the cable and connector in the mainframe cabinet can cause faults in the system. You can trace cables and connectors from the mainframe communication bulkhead to internal cabling or to the peripheral subsystems.

Inside the front door (in a literature holder) of each mainframe is an information package that contains the cable configuration map, identification stickers, and the cable labels. If you make a change to the cable configuration, you must attach the correct labels to the cables, inform the operator, and update the cable configuration map.

For a figure of the cable configuration map, labelling scheme, and more cable information, see the section on connecting the CYBER 930 Computer System in the CYBER 930 Installation Guide [Control Data publication 60469530].

The table and figures that are on the fellowing pages show you how to identify the cables and connectors on the 930 or 932 mainframe bulkheads and backpanels.

Most power control cables are at the AC distribution rack. Refer to the front panel of the AC distribution rack in the section-2 module, Mainframe Power Troubleshooting, for details.

When you replace any cable, do the following:

- Power down the mainframe from the system console and set the service switch to OFF. If the mainframe has the battery backup option, make sure you set the circuit breaker in the battery charger box to OFF and reset it to ON after maintenance service.

CAUTION

Handle every backpanel cable connector with care. To prevent bending of the backpanel pins, do not force the connector in or out of its slot.

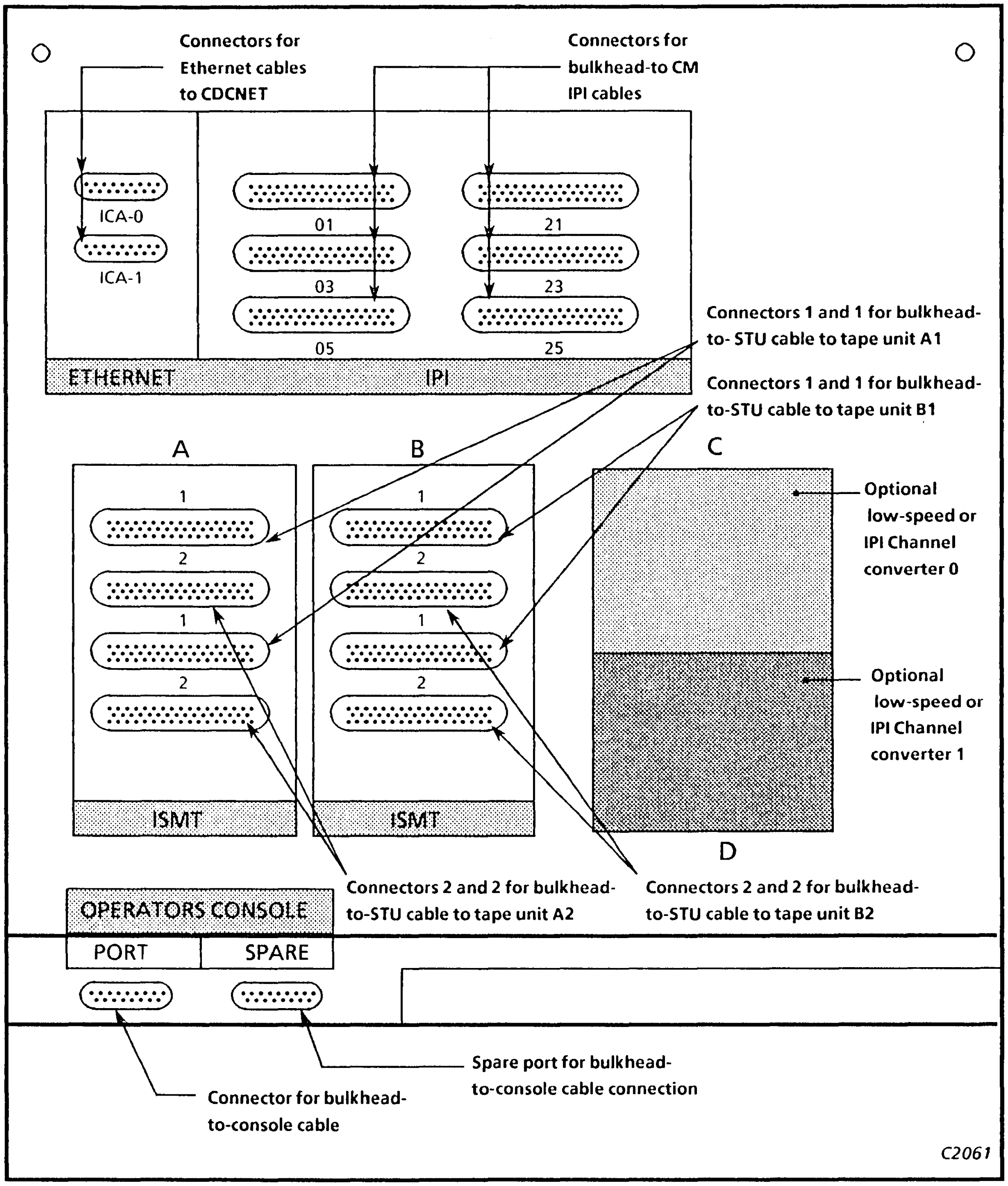
- Bent pins may be the cause of the problems. Before you replace any cable, check the pins in the cable and the backpanel.

- Tighten the retention screws on the connector to ensure firm mating of the signal pins.

- Attach the correct labels or identification stickers from the information package to each connector at both ends of the replacement cable. All IPI cables have a color label at both ends of the connectors to indicate that the cable is connected to the left or right port (blue label for left port, red label for right port) of the control module or the disk drive.

- Use a replacement cable that has the same part number and is the same length as the cable you are replacing.
- If you need to cut the cable ties for cable replacement, you must restrap the cables with new cable ties.

Mainframe Bulkhead Connection



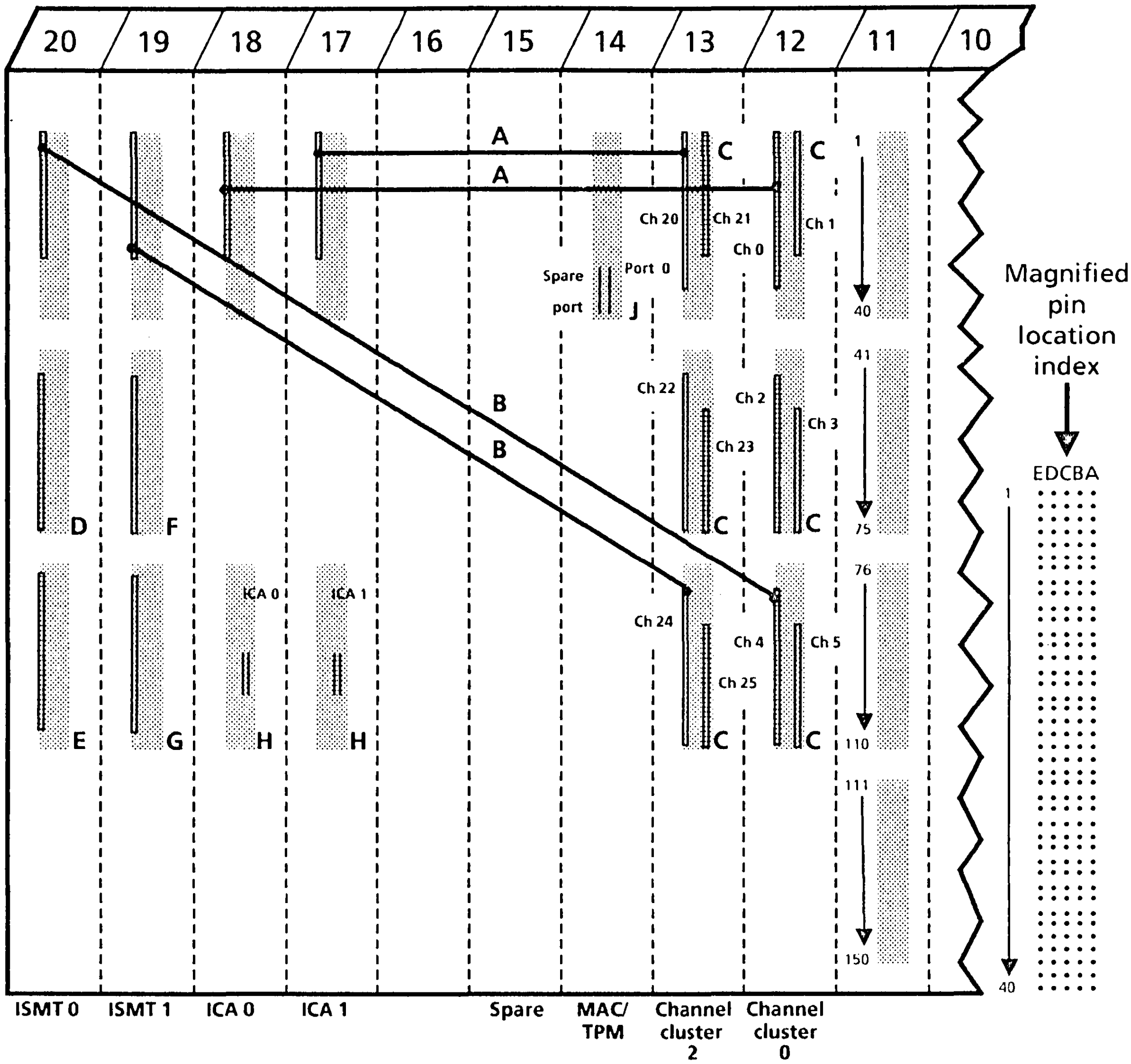
Backpanel Pin Locations for 930 Channel Paks

Channel Number	Slot Number	Interface Type	Backpanel Connector Pins	Pin #1 for Berg Block Connector
00	12	ICI	D001 - D030	E001
20	13		E001 - E030	
01	12	IPI	A001 - A025	A025
21	13		B001 - B025	
02	12	ICI	D046 - D075	E046
22	13		E046 - E075	
03	12	IPI	A051 - A075	A075
23	13		B051 - B075	
04	12	ICI	D081 - D110	E081
24	13		E081 - E110	
05	12	IPI	A086 - A110	A110
25	13		B086 - B110	

Backpanel Pin Locations for 930 Adapters and TPM/MAC

Pak Type	Slot Number	Interface Type	Backpanel Connector Pins	Pin #1 for Berg Block Connector
TPM/MAC	14	Special	B032 - B039	B032
		Special	D032 - D039	D032
ICA	18 or 17	ICI	D001 - D030 E001 - E030	D001
		Ethernet	A088 - A097 B088 - B097	A088
ISMT adapter	20 or 19	ICI	D001 - D030 E001 - E030	D001
		ISI	D045 - D074 E045 - E074	D045
		ISI	D078 - D107 E078 - E107	D078

930 Backpanel Connector and Cable Locations



A Channel-to-ICA cable
B Channel-to-ISMT cable
C Connector location for channel-to-bulkhead IPI cable
D Connector location for ISMT-to-bulkhead cable (panel A - top 1 and 2)
E Connector location for ISMT-to-bulkhead cable (panel A - bottom 1 and 2)
F Connector location for ISMT-to-bulkhead cable (panel B - top 1 and 2)
G Connector location for ISMT-to-bulkhead cable (panel B - bottom 1 and 2)
H Connector location for ICA-to-bulkhead cable
J Connector location for TPM-to-bulkhead cable

C2190

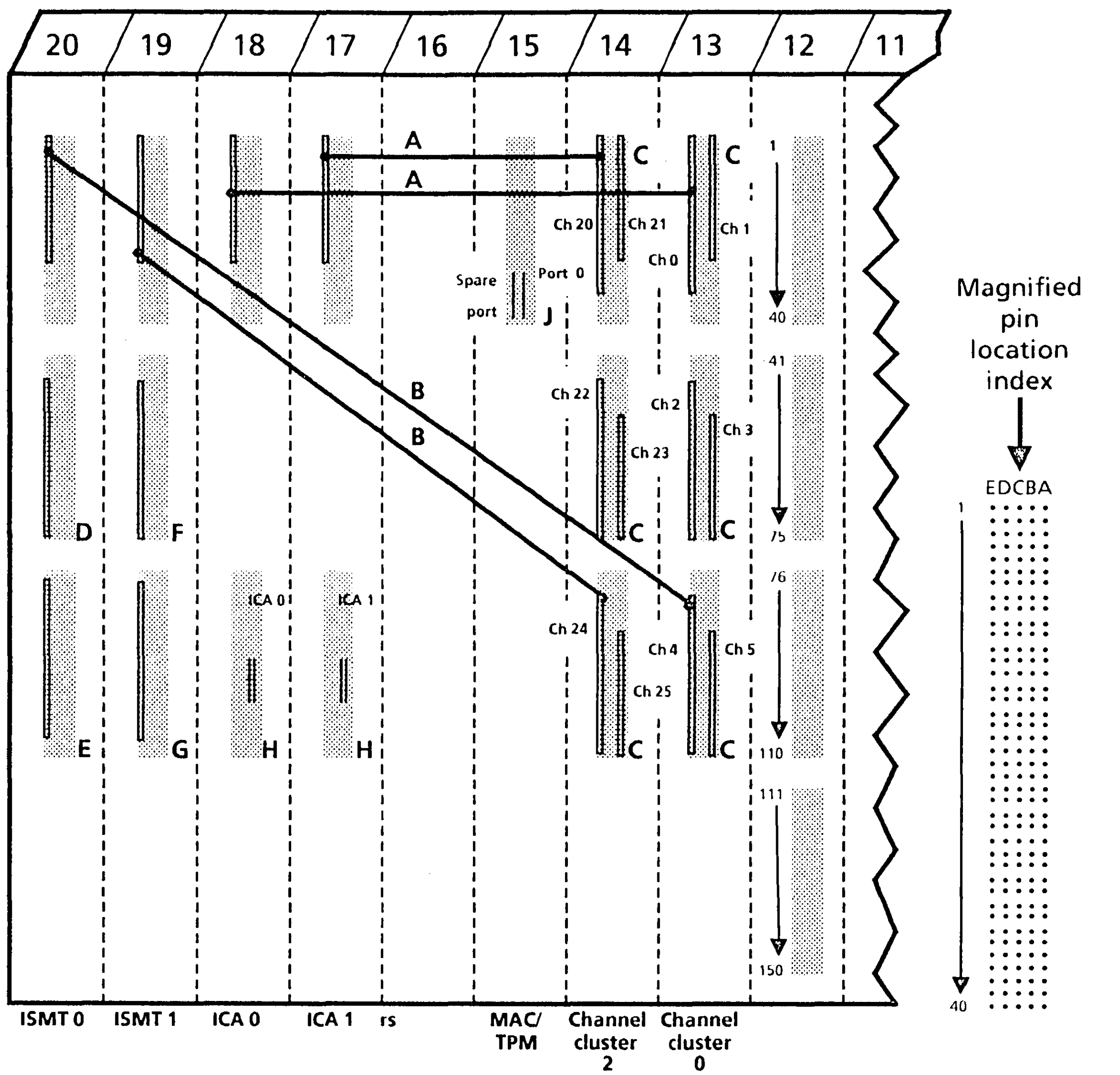
Backpanel Pin Locations for 932 Channel Paks

Channel Number	Slot Number	Interface Type	Backpanel Connector Pins	Pin #1 for Berg Block Connector
00	13	ICI	D001 - D030	E001
20	14		E001 - E030	
01	13	IPI	A001 - A025	A025
21	14		B001 - B025	
02	13	ICI	D046 - D075	E046
22	14		E046 - E075	
03	13	IPI	A051 - A075	A075
23	14		B051 - B075	
04	13	ICI	D081 - D110	E081
24	14		E081 - E110	
05	13	IPI	A086 - A110	A110
25	14		B086 - B110	

Backpanel Pin Locations for 932 Adapters and TPM/MAC

Pak Type	Slot Number	Interface Type	Backpanel Connector Pins	Pin #1 for Berg Block Connector
TPM/MAC	15	Special	B032 - B039	B032
		Special	D032 - D039	D032
ICA	18 or 17	ICI	D001 - D030 E001 - E030	D001
		Ethernet	A088 - A097 B088 - B097	A088
ISMT adapter	20 or 19	ICI	D001 - D030 E001 - E030	D001
		ISI	D045 - D074 E045 - E074	D045
		ISI	D078 - D107 E078 - E107	D078

Backpanel Connector and Cable Locations



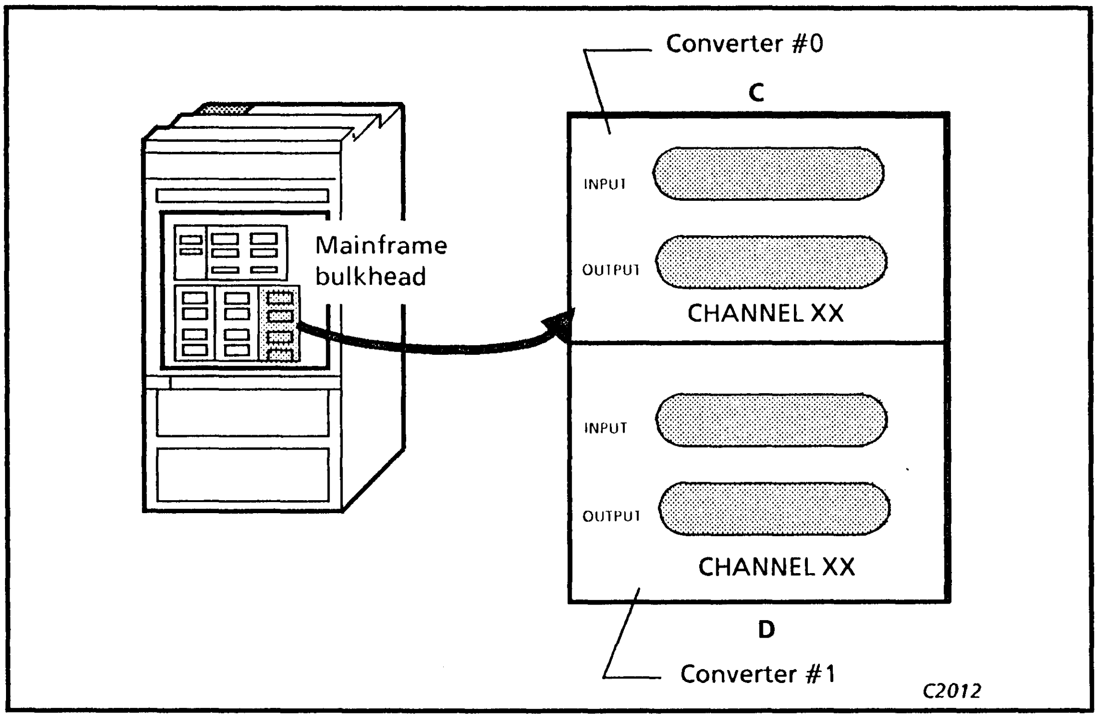
A Channel-to-ICA cable
B Channel-to-ISMT cable
C Connector location for channel-to-bulkhead IPI cable
D Connector location for ISMT-to-bulkhead cable (panel A - top 1 and 2)
E Connector location for ISMT-to-bulkhead cable (panel A - bottom 1 and 2)
F Connector location for ISMT-to-bulkhead cable (panel B - top 1 and 2)
G Connector location for ISMT-to-bulkhead cable (panel B - bottom 1 and 2)
H Connector location for ICA-to-bulkhead cable
J Connector location for TPM-to-bulkhead cable

C2006

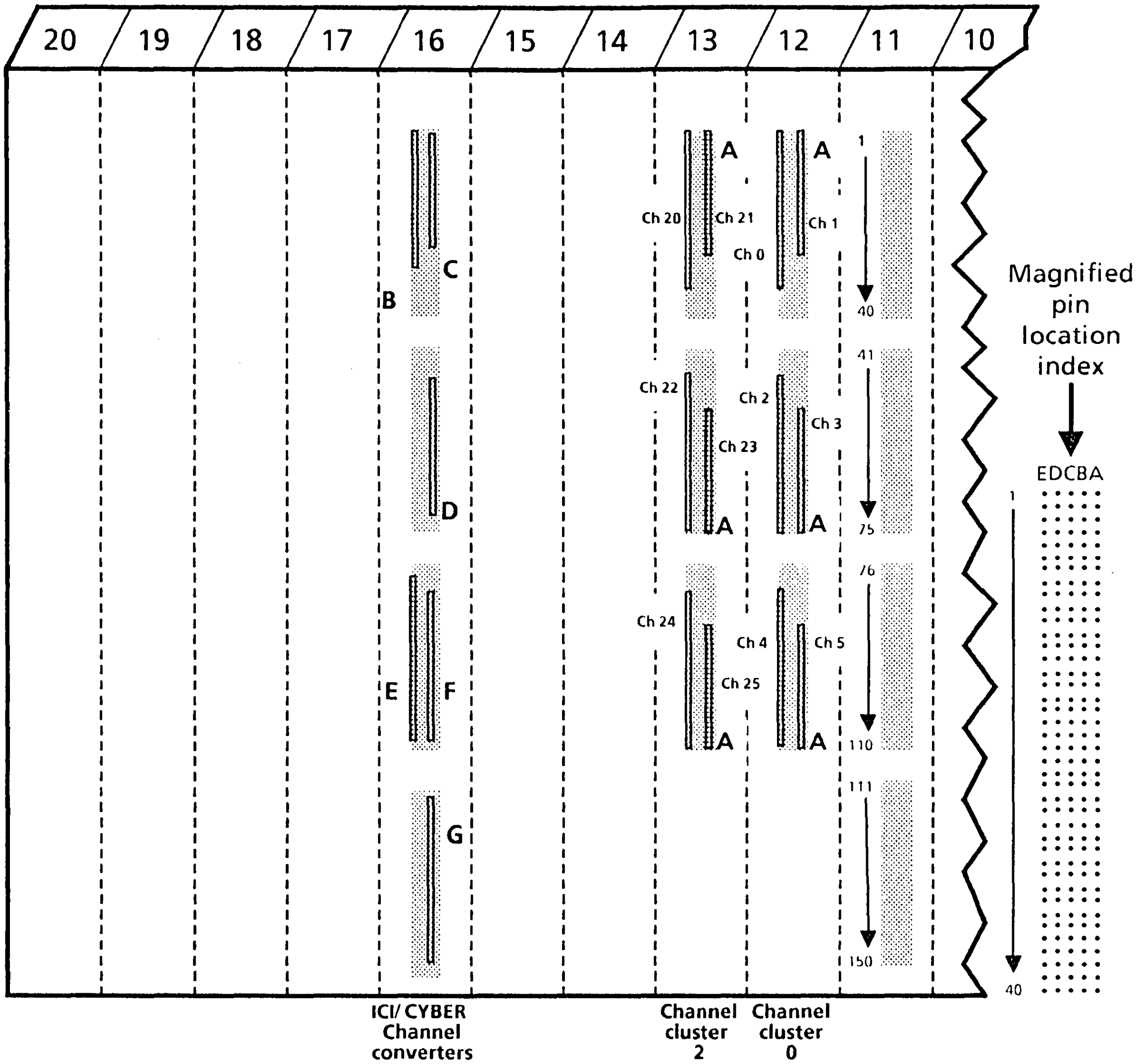
Backpanel Pin Locations for Low-speed Channel Converters

Pak Type	Slot Number	Interface Type	Backpanel Connector Pins	Pin #1 for Berg Block Connector
Low-speed Converter	16	ICI 0	D001 - D030 E001 - E030	D001
		ICI 1	D078 - D107 E078 - E107	D078
		170-0 input	B050 - B074 A050 - A074	B050
		170-0 output	B001 - B025 A001 - A025	B001
		170-1 input	B083 - B107 A083 - A107	B083
		170-1 output	B117 - B141 A117 - A141	B117

Bulkhead Connectors Locations for Low-speed Channel Converters



Backpanel Connector and Cable Locations for Low-speed Channel Converters



NOTE: Channel paks for CYBER 930 are in slots 12 and 13, whereas channel paks for CYBER 932 are in slots 13 and 14. The above figure shows the CYBER 930 backpanel.

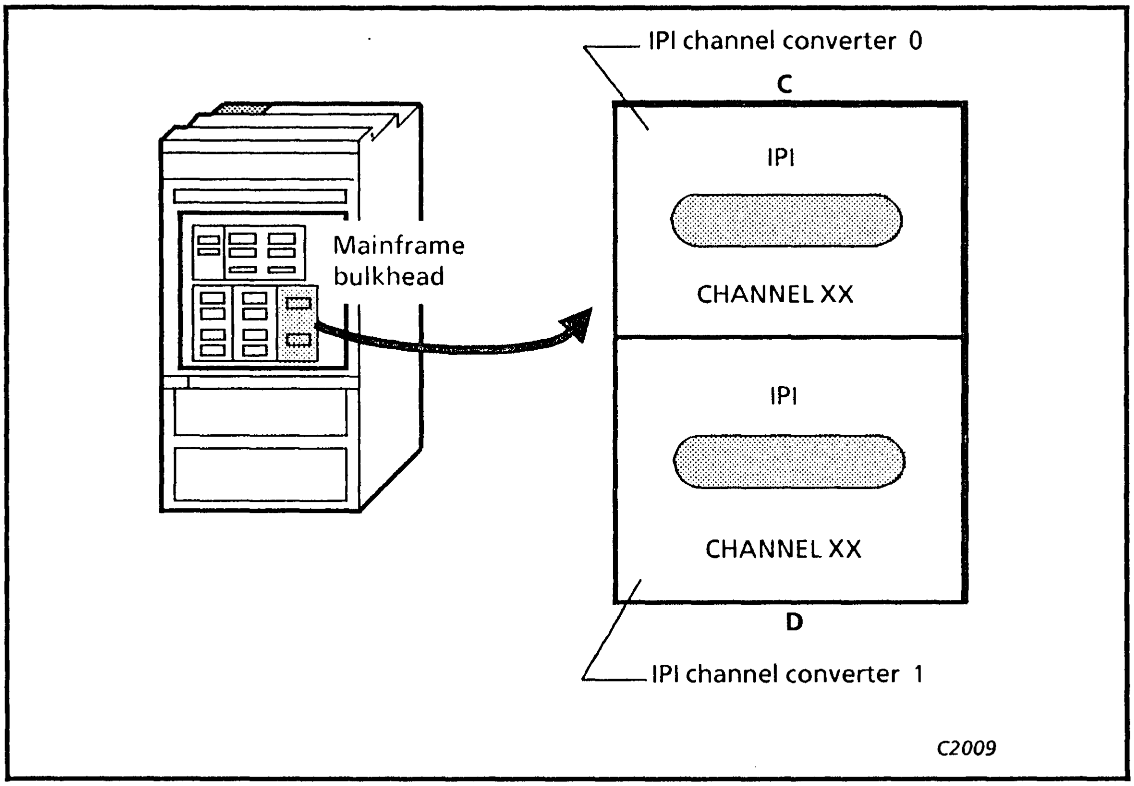
A Connector location for channel-to-bulkhead IPI cable
B Connector location for converter 0-to-ICI channel cable
C Connector location for converter 0-to-bulkhead CYBER 170 output cable (panel C)
D Connector location for converter 0-to-bulkhead CYBER 170 input cable (panel C)
E Connector location for converter I-to-ICI channel cable
F Connector location for converter I-to-bulkhead CYBER 170 input cable (panel D)
G Connector location for converter I-to-bulkhead CYBER 170 output cable (panel D)

C2191

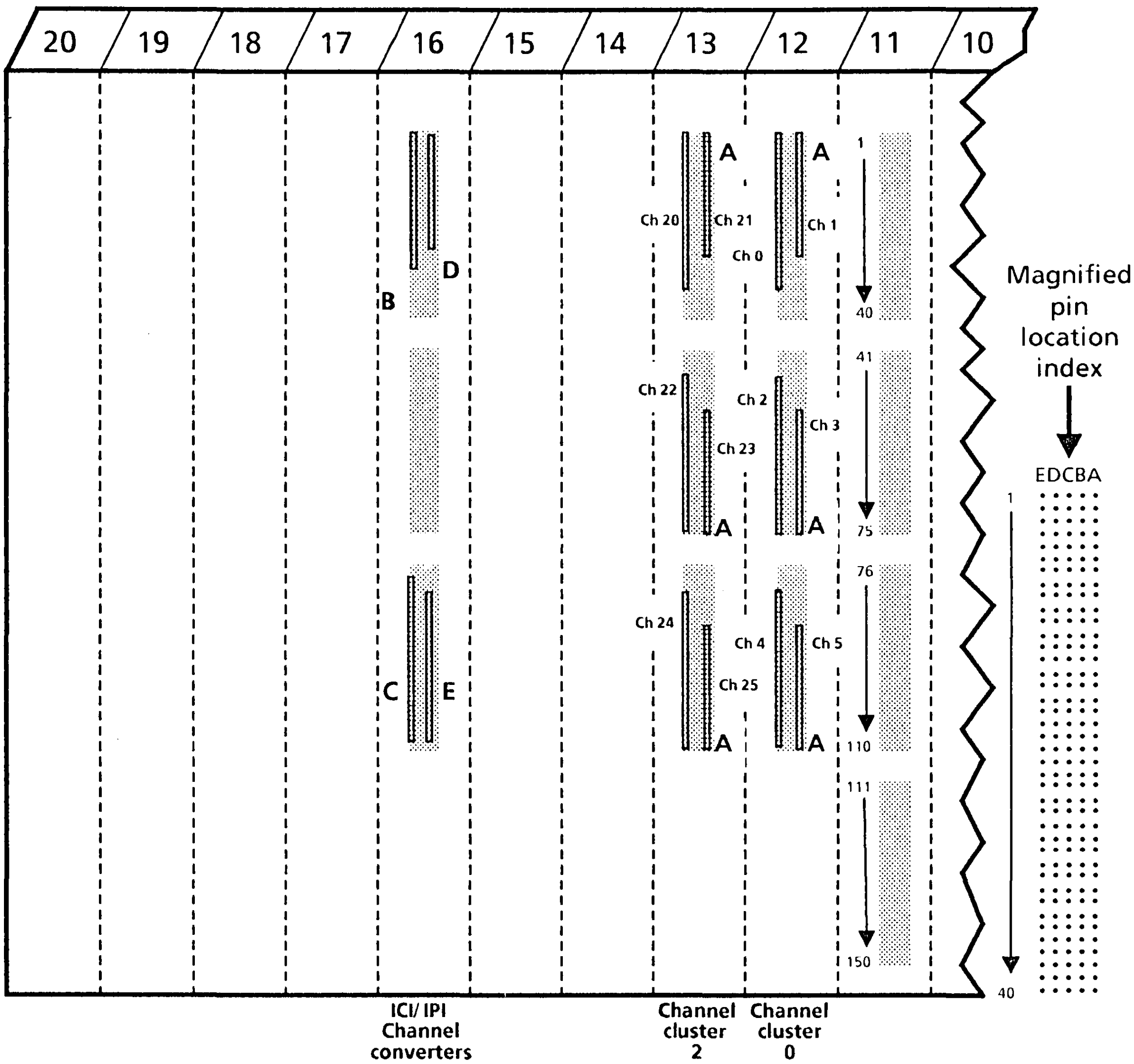
Backpanel Pin Locations for IPI Channel Converters

Pak Type	Slot Number	Interface Type	Backpanel Connector Pins	Pin #1 for Berg Block Connector
IPI Channel Converter	16	ICI 0	D001 - D030 E001 - E030	D001
		ICI 1	D078 - D107 E078 - E107	D078
		IPI 0	B001 - B025 A001 - A025	B001
		IPI 1	B083 - B107 A083 - A107	B050

Bulkhead Connector Locations for IPI Channel Converters



Backpanel Connector and Cable Locations for IPI Channel Converters



NOTE: Channel paks for CYBER 930 are in slots 12 and 13, whereas channel paks for CYBER 932 are in slots 13 and 14. The above figure shows the CYBER 930 backpanel.

A Connector location for channel-to-bulkhead IPI cable
B Connector location for IPI converter 0-to-ICI channel cable
C Connector location for IPI converter 1-to-ICI channel cable
D Connector location for IPI converter 0-to-bulkhead IPI cable (panel C)
E Connector location for IPI converter 1-to-bulkhead IPI cable (panel D)

C2008

Tape Cabinet Procedures - Quick Reference Table

The tape cabinet procedures are for assemblies in the tape cabinet shown on the opposite page. Procedure names and numbers are shown in the table below.

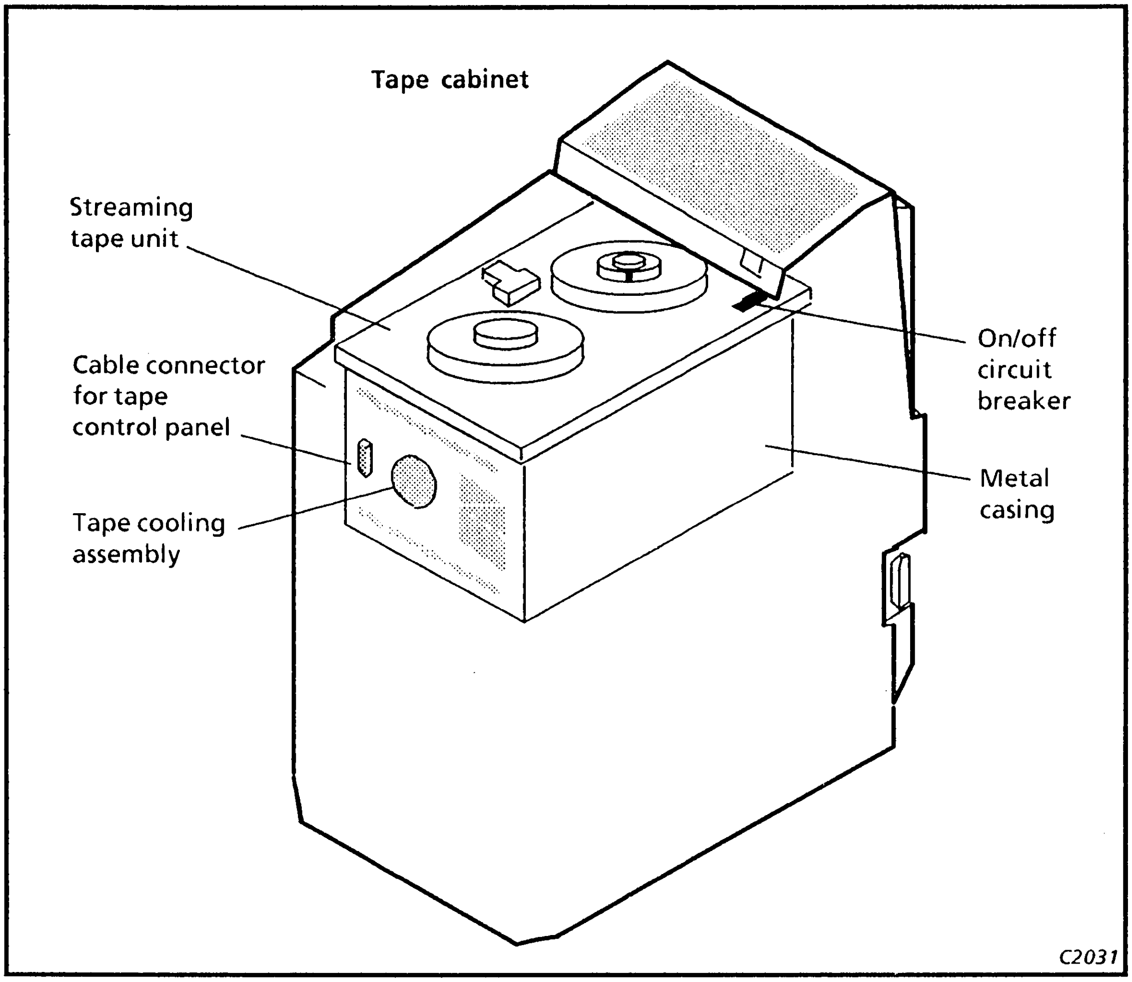
Streaming Tape Unit (STU)

The tape subsystem contains many replaceable boards and assemblies. See the subsequent module, Placing the Streaming Tape Unit in the Maintenance Position, before referring to the Streaming Tape Unit Hardware Maintenance Manual [Control Data publication 49763100] for removal, replacement, and repair verification procedures.

Procedures not fully covered in the above mentioned manual, such as those for the entire tape unit, tape cooling fan, and tape control panel, are covered in this manual. Refer to the table below for the procedure number.

Assembly	Procedure Number
Tape cooling fan	16
Tape control panel	19
Streaming tape unit	25

Replaceable Assemblies in the Tape Cabinet



Disk Cabinet Procedures - Quick Reference Table

The disk cabinet procedures are for assemblies and components in the disk peripheral cabinet are shown on the opposite page. These procedures and the number of the procedure in which they are found are in the following table.

Assembly	Procedure Number
AC distribution rack	12
Disk display panel	13
Battery assembly	14
Battery charger box	15
Air filter	17
Cables and connectors for peripheral cabinets	18
Control module (CM)	20
Main logic board and I/O panel assembly	21
CM air filter, error display, and fan	22
CM power supply	23
Fixed storage drive	24
Fixed storage drive power supply	See below

WARNING

Before servicing a fixed storage drive or the power supply of the fixed storage drive, position the stabilizer in the outward position.

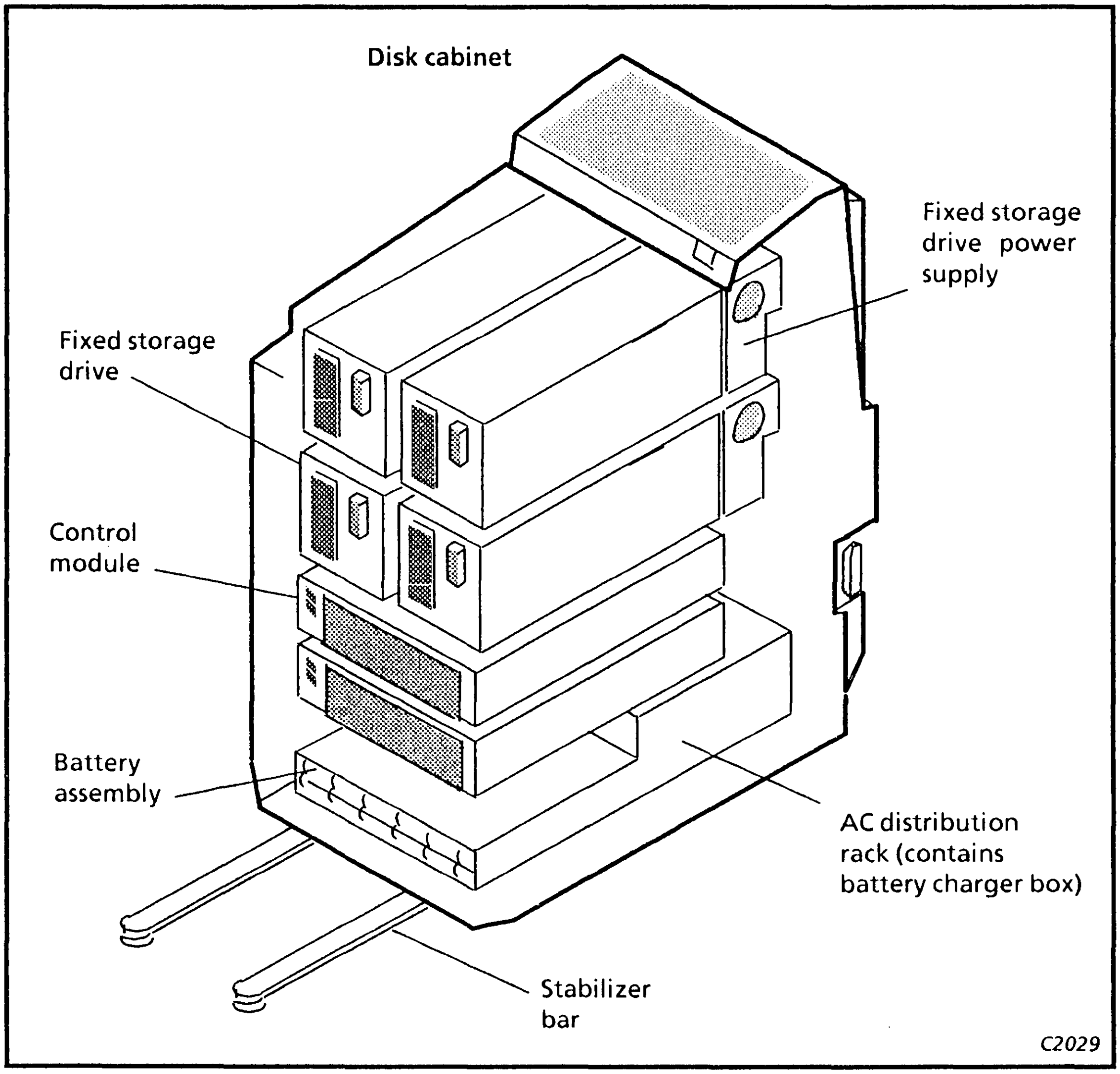
Fixed Storage Drive

Each fixed storage drive contains such replaceable units as the brake assembly, hard disk module, fan assembly, and logic cards. Refer to the Fixed Storage Drive Hardware Maintenance Manual [Control Data publication 83325610] for removal and replacement procedures.

Fixed Storage Drive Power Supply

The power supply of the fixed storage drive is attached to the back of the fixed storage drive. You must remove the entire drive according to procedure 24 before you can remove the power supply. However, do not remove the drive unless the replacement power supply is available. If a cabinet is left with an empty drive slot while the other drives are operating, overheating may occur and shut down the drives. Refer to the Fixed Storage Drive Hardware Maintenance Manual [Control Data publication 83325610] for power supply removal and replacement procedures.

Replaceable Assemblies and Components in a Disk Cabinet



Tape/Disk Cabinet Procedures - Quick Reference Table

The tape/disk cabinet procedures shown below are for assemblies in the peripheral cabinet that house a tape subsystem and two disk subsystems. Except for the additional tape subsystem assemblies, assemblies in the tape/disk cabinet are identical to the disk cabinet assemblies.

Assembly	Procedure Number
AC distribution rack	12
Battery assembly	14
Battery charger box	15
Tape cooling fan	16
Air filter	17
Cables and connectors for peripheral cabinets	18
Tape control panel	19
Control module (CM)	20
Main logic board and I/O panel assembly	21
CM air filter, error display, and fan	22
CM power supply	23
Fixed storage drive	24
Streaming tape unit	25
Fixed storage drive power supply	See below

WARNING

Before servicing a fixed storage drive or fixed storage drive power supply, or before putting the streaming tape unit in the servicing position, pull the stabilizer bars outward.

Fixed Storage Drive

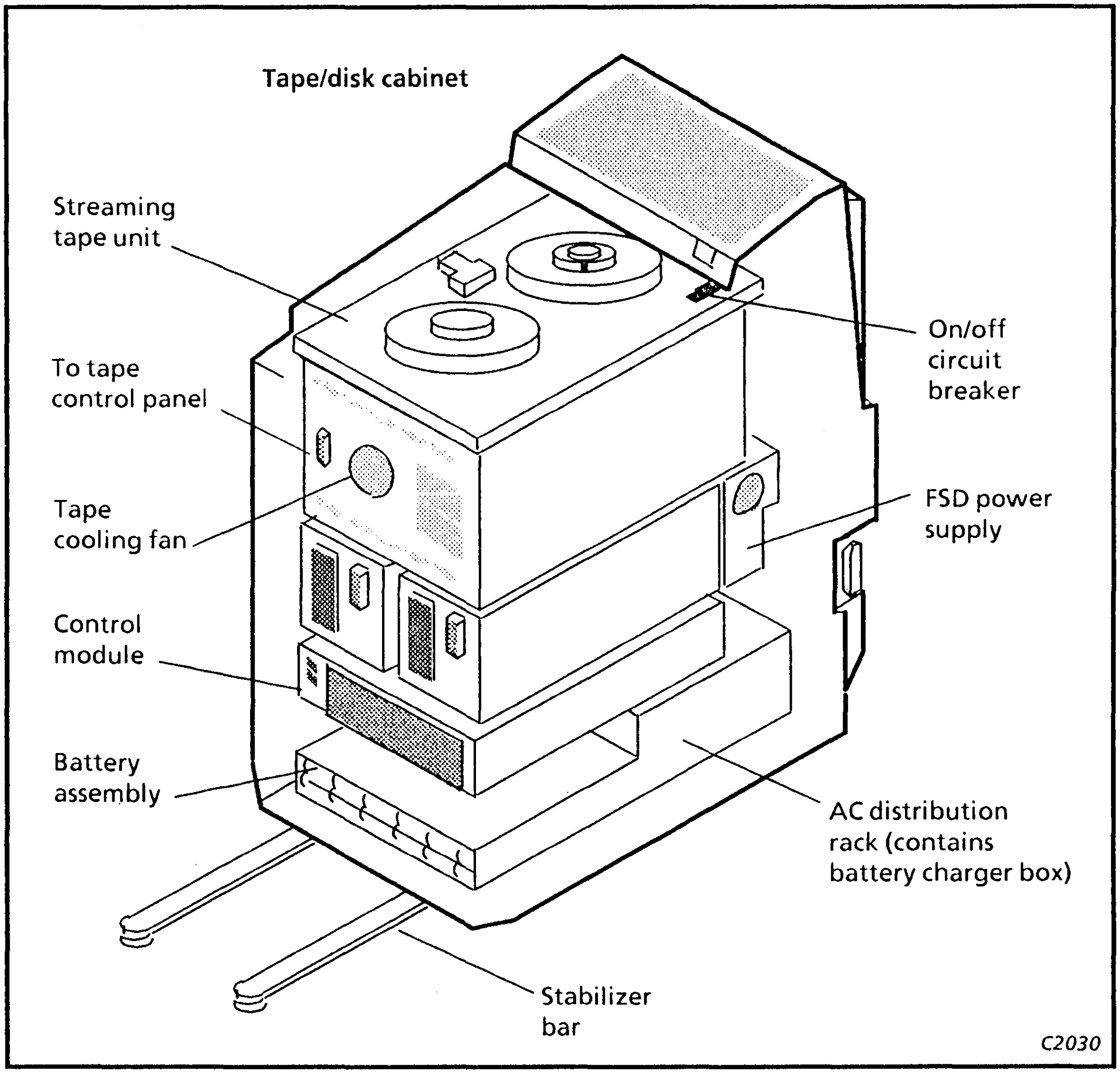
Each fixed storage drive contains such replaceable assemblies as the hard disk assembly, motor, brake, and logic cards. To remove the storage drive power supply, you must remove the entire fixed storage drive according to procedure 24. However, do not remove the drive unless the replacement power supply is available. If a cabinet is left with an empty drive slot while the other drives are operating, overheating may occur and shut down the drives.

Refer to the Fixed Storage Drive Hardware Maintenance Manual [Control Data publication 83325610] for removal and replacement procedures.

Streaming Tape Unit

The streaming tape unit contains many replaceable boards and assemblies. See the subsequent module, Placing the Streaming Tape Unit in the Maintenance Position, before referring to the Streaming Tape Unit Hardware Maintenance Manual [Control Data publication 49763100] for removal, replacement, and repair verification procedures.

Assemblies in a Tape/Disk Cabinet



Placing the Streaming Tape Unit in the Maintenance Position

Use the following procedure to place the streaming tape unit (STU) in the maintenance position. After servicing the STU, return it to the normal position by reversing the steps. Before returning the cabinet to the customer, make sure that you rotate the pawl fastener clockwise to secure the tape deck .

1. If the computer system has another tape unit on the same channel as the tape unit you want to service, disconnect the two logic cables from the back of the tape unit being serviced. While you take the unit offline for servicing, the system still has access to the other unit.

2. Unload the tape. Set the circuit breaker on top of the tape deck to OFF.

3. Unplug the power cord from the wall outlet (60 Hz) or from the power bar (50 Hz).

4. Open the front door. Remove the door by lifting it up from its two hinges and place the door on the left side of the cabinet.

5. Remove the holding screws to open the metal door of the tape unit.

6. Check for two shipping bolts, one at each corner of the metal casing as shown in the figure on the next page.

   If there are no shipping bolts, the cabinet has a latching mechanism. The tape/disk cabinet also has a removeable shield between the tape unit and the disk units. Follow steps 7A through 16A.

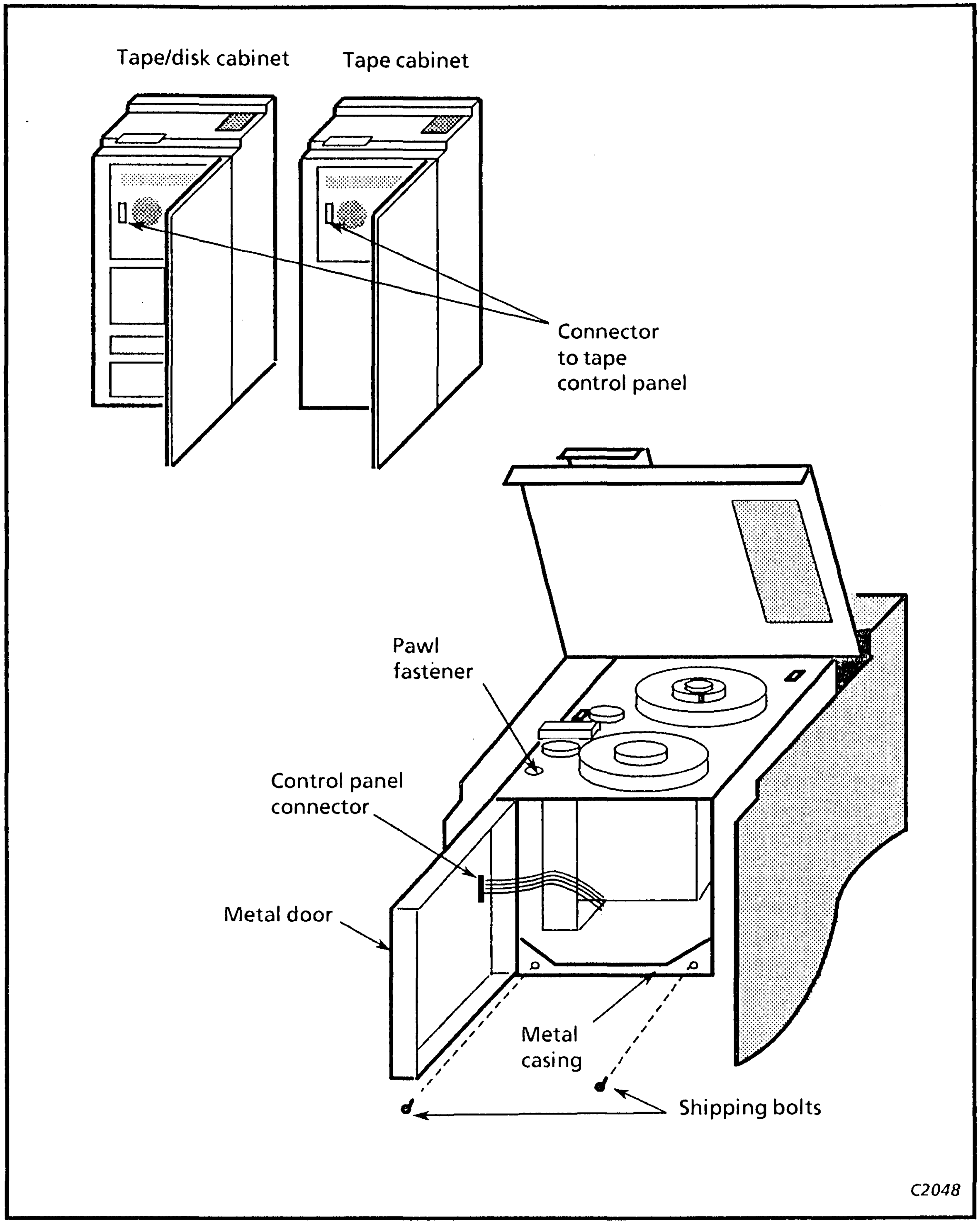
7. Remove the two shipping bolts.

8. Using a straight-slot screwdriver, rotate the pawl fastener on the lower left side of the tape deck a half turn counterclockwise to release the tape deck.

9. Swing the tape deck up to the vertical position.

10. Return the tape unit to the normal position by reversing steps 1 through 9.

Streaming Tape Unit (Front View)



7A. Check inside the top left corner of the tape unit, behind the interlock switch, for a shipping hold-down bolt as shown in the figure on the next page.

If there is no hold-down bolt, proceed to the next step. If there is a hold-down bolt, remove it with a 10-mm (3/8 in) socket wrench and discard the hold-down bolt.

For an STU in a stand-alone tape cabinet, skip italicized steps 8A, 9A, 10A, 11A and 16A.

8A. Position the stabilizer bars in the outward position.

9A. Set the main circuit breaker to OFF. If the cabinet has the battery backup option, set the circuit braker on the battery charger box to OFF.

10A. Disconnect all the cables from the back of the fixed storage drive and pull the fixed storage drives to their fully extended positions. This gives you enough room to swing the STU up in a later step.

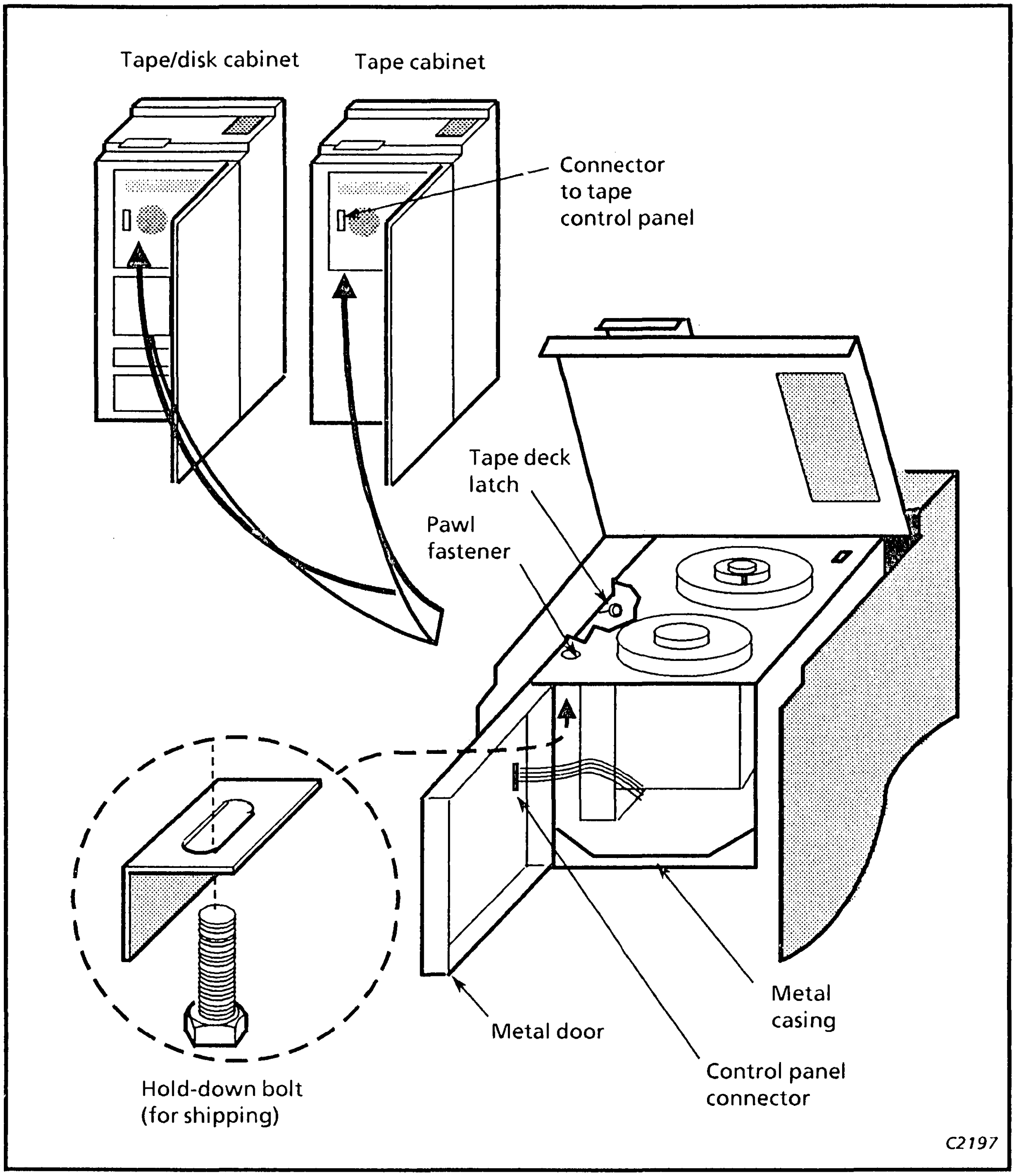
11A. Remove the tape shield between the tape unit and the fixed storage drive as follows:

a. Remove the shield clamp by removing the two sets of screw and lockwasher. See the figure, Tape Shield, on the next two pages for the location of the shield clamp.

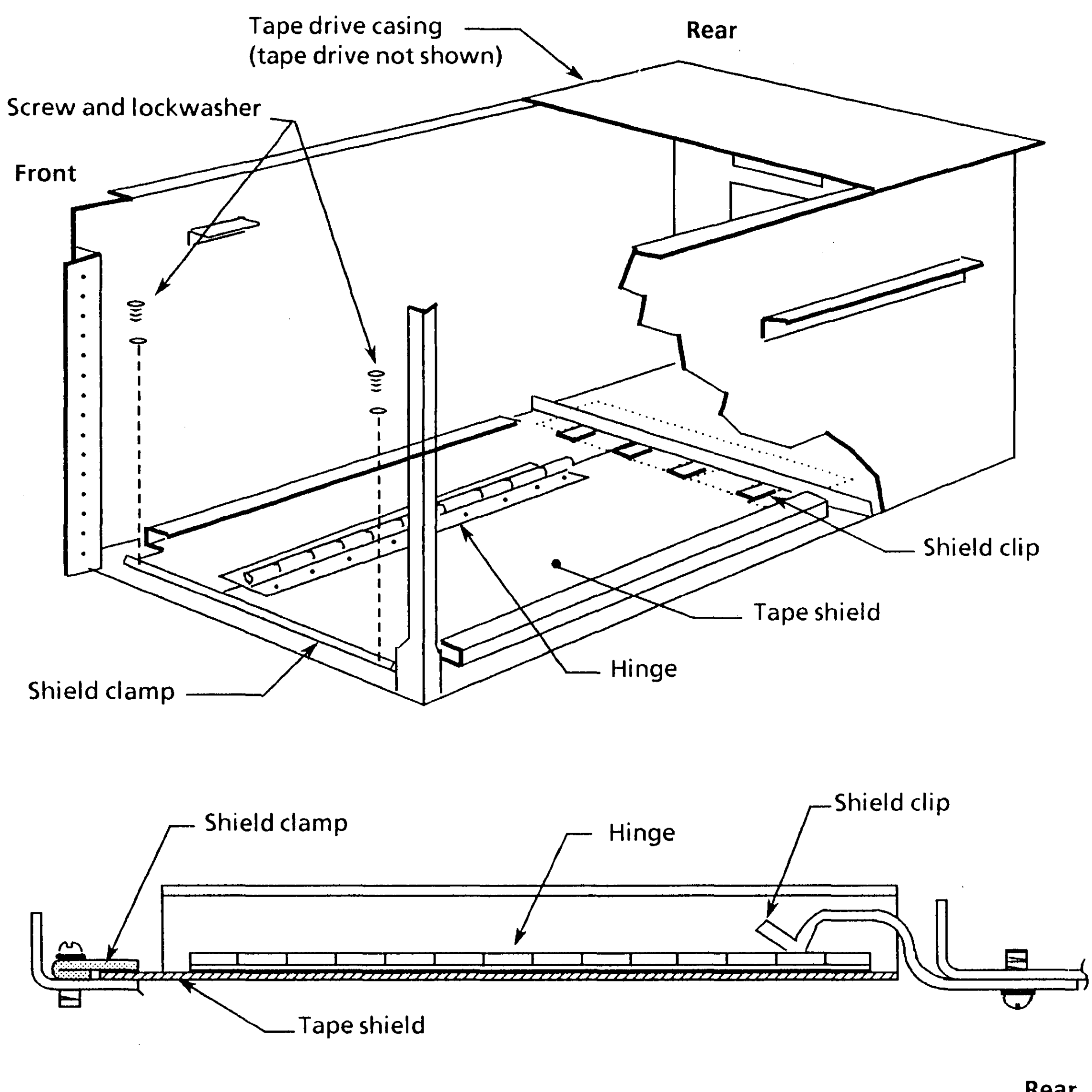
b. Lift the tape shield and pull it forward until its end disengages from the shield clip that is at the back of the tape drive casing.

c. Fold the tape shield to the angle shown in the figure, Tape Shield Removal, and take the tape shield out.

Streaming Tape Unit (Front View)



Tape Shield



Side view of tape shield

12A. Using a straight-slot screwdriver, rotate the pawl fastener on the lower left side of the tape deck a half turn counterclockwise to release the tape deck.

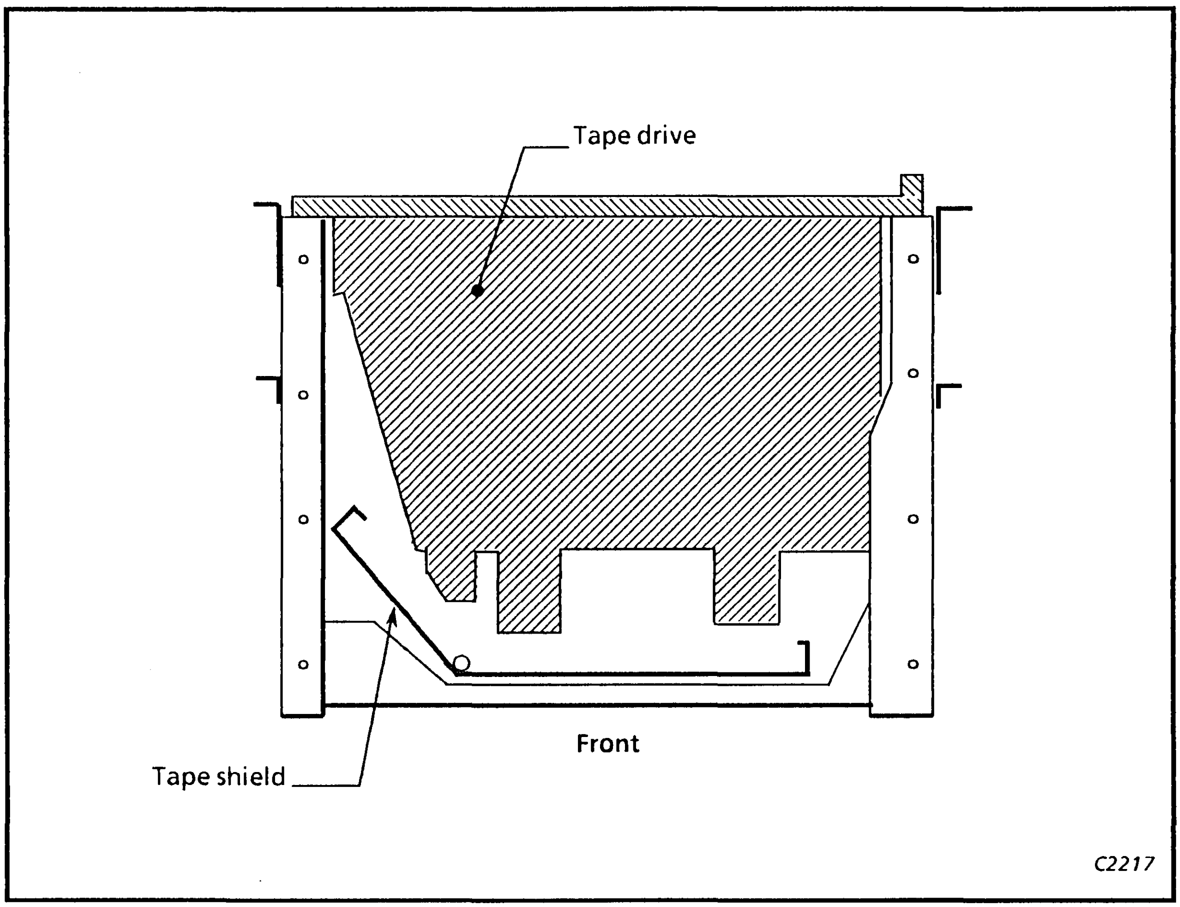
13A. While pressing down on the front of the tape deck with your right hand, pull the ring of the spring-loaded tape deck latch on the pivot bracket with your left hand.

14A. With the latch extended, allow the front of tape deck to rise. Pull the tape deck upward.

15A. Release the tape deck latch and swing the tape deck up until the latch engages and the tape deck locks in the vertical position.

16A. Push the fixed storage drives into their original positions.

Tape Shield Removal



Procedure 12 - AC Distribution Rack

Besides distributing AC power to power components, the AC distribution rack, which contains the main circuit breaker and a service switch, also protects the power components. Use the following procedures to replace the rack.

Replacement

1. Power off the system from the console and set the main circuit breaker to OFF.

2. If the AC distribution rack has the battery backup option, set the circuit breaker on the charger box to OFF.

3. Unplug the peripheral power cable from the wall outlet.

4. If the battery backup option is installed, remove the battery charger box and battery packs as follows:

   a. From the front of the cabinet, remove the protective cover of the AC distribution rack.

   b. Disconnect the cable connectors from all battery packs and remove battery packs.

   c. Disconnect DC output power cables from the charger box.

   d. Remove the charger box by removing the four holding screws.

5. Disconnect the power cables and power control terminator from the AC distribution rack. The terminator at J4 is in the last cabinet of the power control chain only.

6. Remove mounting screws and pull out the AC distribution rack.

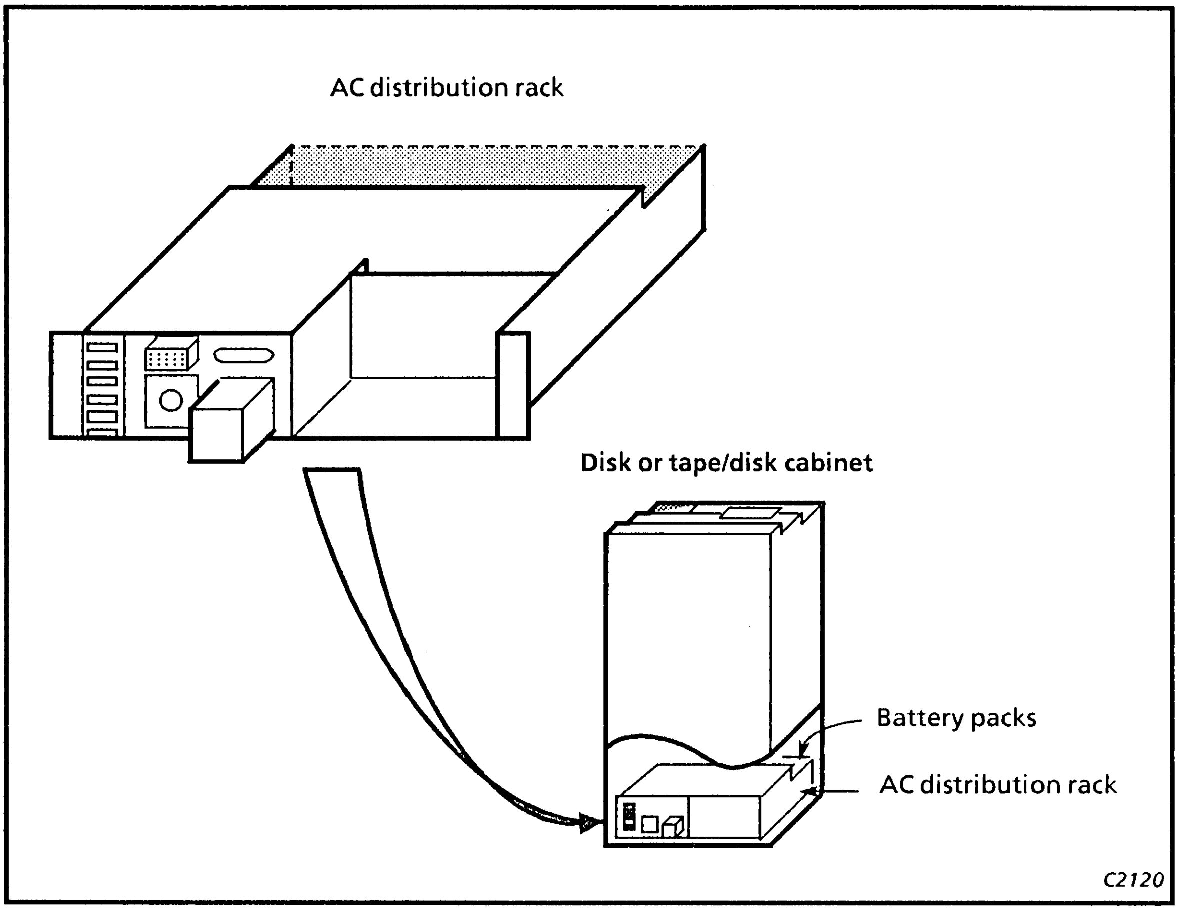
7. Install the replacement unit by reversing steps 1 through 6.

Verification

1. Verify that AC power is distributed to all subsystems within the cabinet.

2. Verify that the battery backup is operating. Refer to procedure 15 for verification of the battery charger box.

AC Distribution Rack - Peripheral Cabinet



Procedure 13 - Disk Display Panel Assembly

The disk control panel shows the power status of the disk cabinet.

Replacement

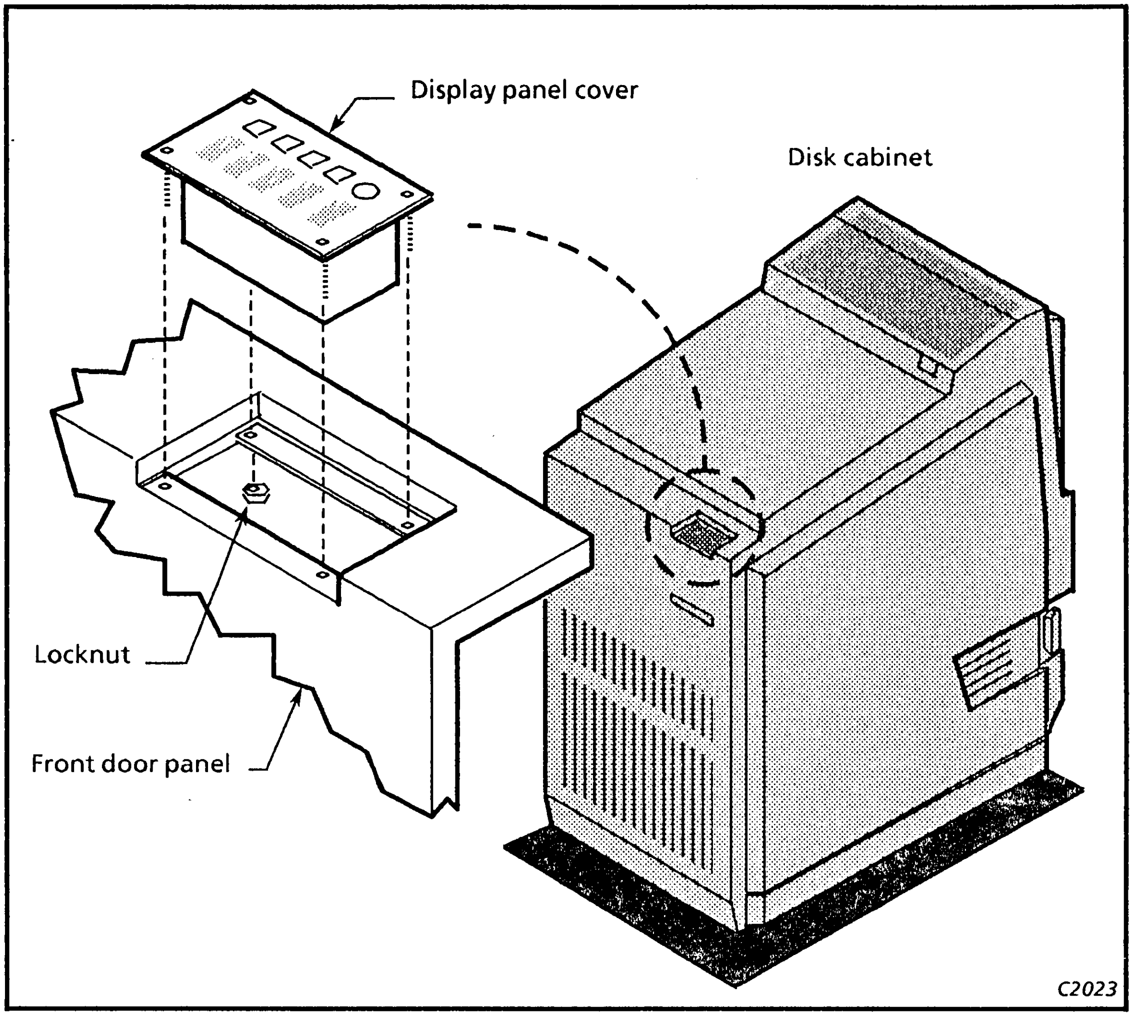
1. Open the front door of the disk cabinet and detach the cable harness from the control display assembly.
2. Remove the four locknuts that hold the disk display panel assembly to the front door as shown in the diagram.
3. Lift out the disk display panel assembly.

NOTE

If the replacement part does not contain the panel cover, remove the cover from the existing assembly and install the cover on the replacement assembly.

4. Reconnect the cable harness to the replacement panel assembly.
5. Position the assembly in its slot and secure it by reinstalling the locknuts removed in step 2.
6. If the main breaker is already set to ON, the indicators should light to indicate power is available.
7. Reset the service switch to SYSTEM.

Disk Display Panel



Procedure 14 - Battery Assembly

The battery assembly and the battery charger box form the battery backup option in a peripheral cabinet. The battery assembly, which contains six packs totalling 120 cells of 2-V batteries, can maintain cabinet power for up to two minutes during power interruption. Refer to the figure and the procedures below to replace the battery assembly.

Replacement

1. Set the service switch to OFF to power off the peripheral cabinet.
2. Set the circuit breaker on the battery charger box to OFF.
3. Open the front door of the peripheral cabinet and remove the front cover of the AC distribution rack.
4. Disconnect all the battery plug connectors from their cable harnesses.

NOTE

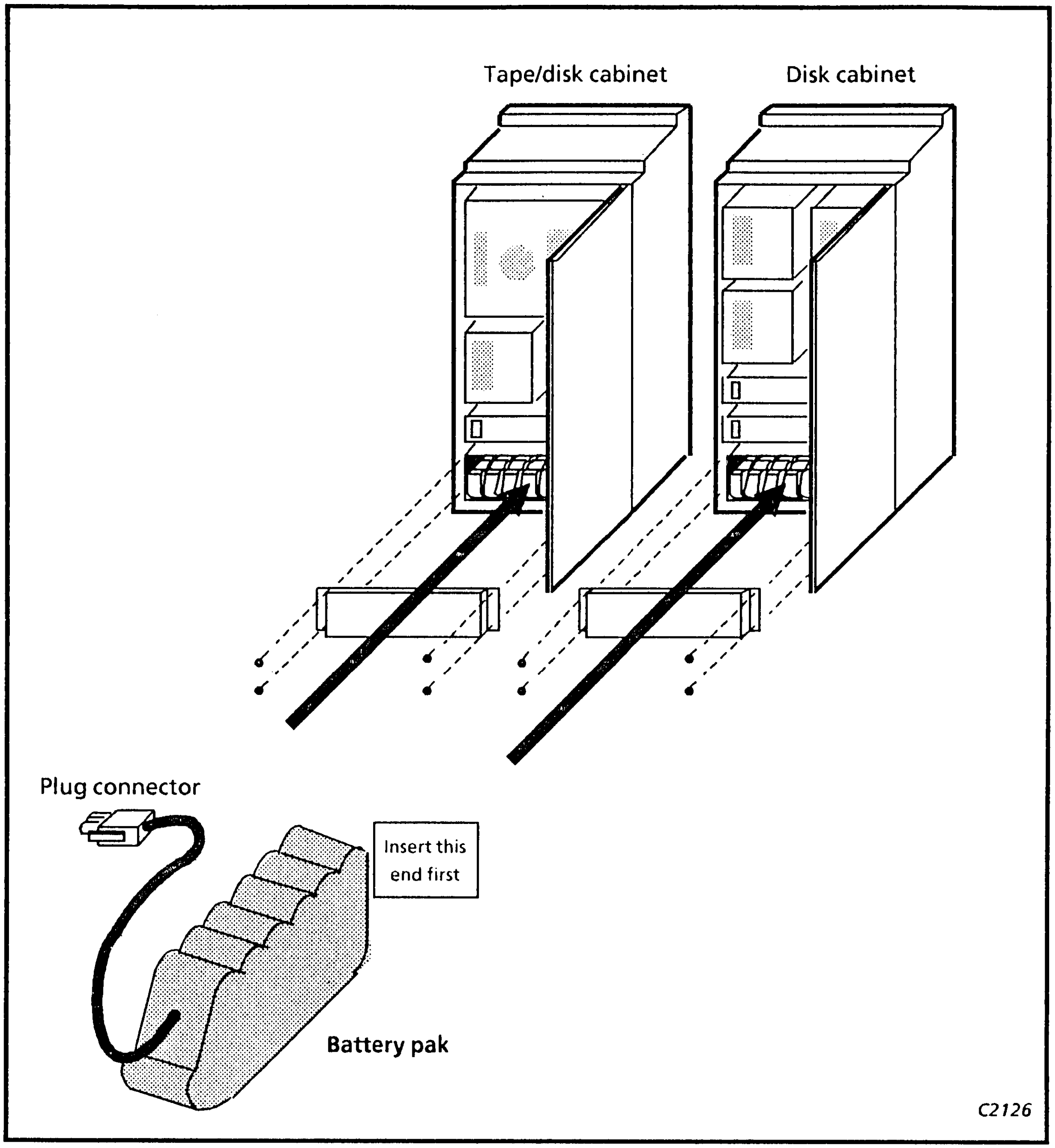
Each set of cable harnesses contains a temperature sensor. Take care not to damage the sensor during step 5.

5. Pull out the battery packs.
6. Install replacement packs by reversing steps 1 though 5.

Verification

1. Set the service switch to ON.
2. Observe the battery status on the charger box. The AVAILABLE indicator should light but not flash. The CHARGER ON indicator can be either ON or OFF. The CHARGER OV and OT indicators should not light.
3. Set the service switch to SYSTEM.

Battery Assembly - Peripheral Cabinet



Procedure 15 - Battery Charger Box

The battery charger box and the battery assembly form the battery backup option in the peripheral cabinet. The control box provides DC charging power to the battery assembly and delivers the DC power backup to maintain cabinet power for up to two minutes during power interruption. Refer to the figure and the procedures below to replace the box.

Replacement

1. Power off the system from the console.
2. Set the main circuit breaker in the peripheral cabinet to OFF.
3. Set the circuit breaker on the battery charger box to OFF.
4. Disconnect the DC output power cable from the charger box.
5. Remove the two mounting screws and pull the charger box out.

NOTE

The back of the battery charger box is connected to a spring-loaded connector in the AC distribution rack. Hold onto the large jumper connector in front of the charger box and apply enough force to disengage the charger box from the spring-loaded connector.

If you have difficulty in removing the battery charger box, remove the whole AC distribution rack and take the rack cover off before removing the charger box.

6. Install the replacement unit to the AC distribution rack by reversing steps 2 through 5.

Verification

1. Power on the peripheral cabinet from the system console.
2. Observe the indicators on the charger box. The AVAILABLE indicator should light but not flash. The CHARGER ON indicator can be either ON or OFF. The CHARGER OV and OT indicators should not light.
3. Observe the battery status indicator on the monitor and control module of the mainframe. The BATTERY ON LINE should not light. If the batteries need recharging, the BATTERY NOT AVAILABLE indicator lights.
4. Take the following steps to verify the battery online operation.

a. Make sure that the service switch is set to SYSTEM and the system is on.

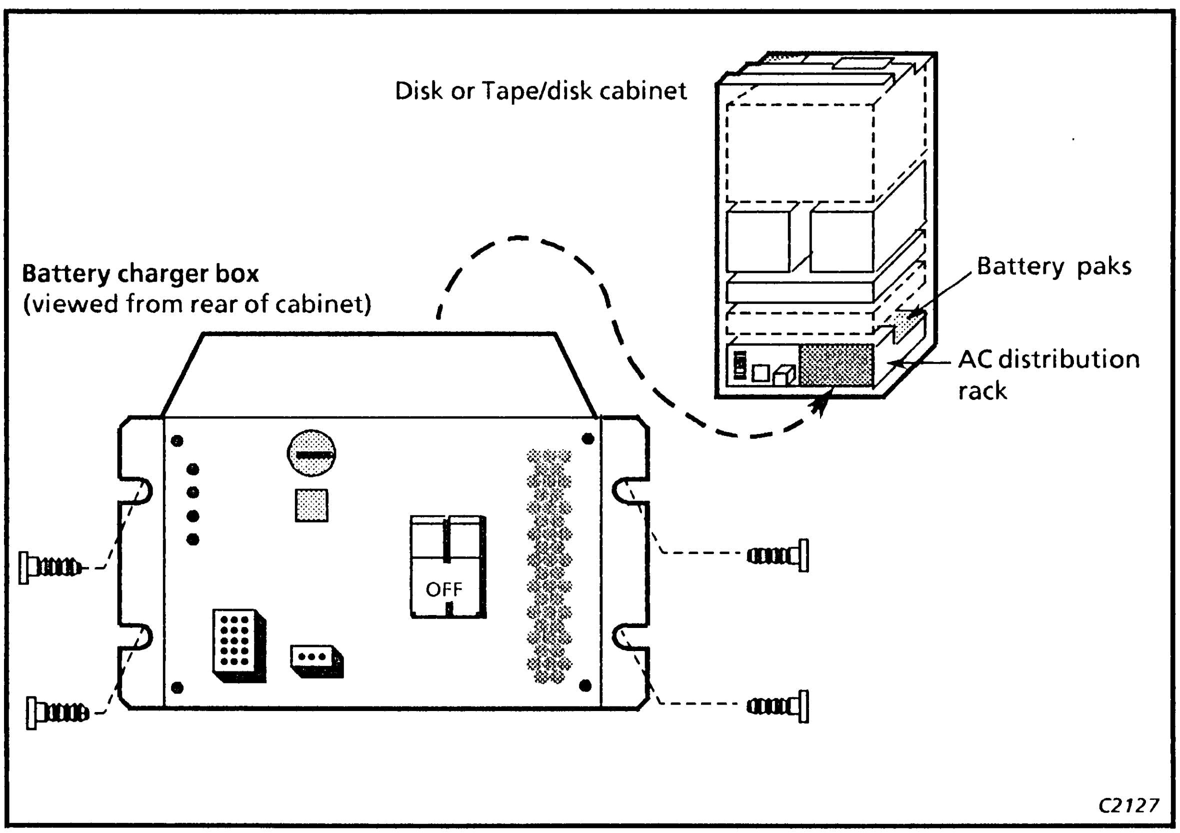
b. Disconnect the AC Hubbell connector from the wall outlet and take a time count of 15 seconds.

c. Verify the following:

- The AVAILABLE ON LINE indicator on the battery charger is flashing.
- The cabinet power remains on.
- The green indicators (start buttons) on each disk drive are lit.
- The two-hexadecimal error display on the control module is on.
- The BATTERY ON LINE indicator on the monitor and control module of the mainframe is on.
- The AC DROP indicator on the monitor and control module is off.

d. After 15 seconds, reconnect the AC hubbell connector to the power outlet.

Battery Charger Box - Peripheral Cabinet



Procedure 16 - Tape Cooling Fan

The tape cooling fan prevents excessive heat buildup in the tape unit. Use the same removal and replacement procedure for the cooling fan in the tape/disk cabinet as for the tape cabinets.

Replacement and Verification

1. If the computer system has another tape unit on the same channel as the tape unit you want to service, disconnect the two logic cables from the back of the tape unit being serviced. While you take the unit offline for servicing, the system still has access to the other unit.

2. Unload the tape. Set the circuit breaker on top of the tape deck to OFF.

3. For the tape cabinet, unplug the power cord of the streaming tape unit from the wall outlet. For the tape/disk cabinet, remove the rear door of the cabinet and disconnect the power cord from the power bar (50 Hz) or from the wall outlet (60 Hz).

4. Remove the front door of the cabinet.

5. Open the metal door by removing the two holding screws.

6. Disconnect the fan cable connector.

7. Dismount the cooling fan from the door by removing the four mounting screws.

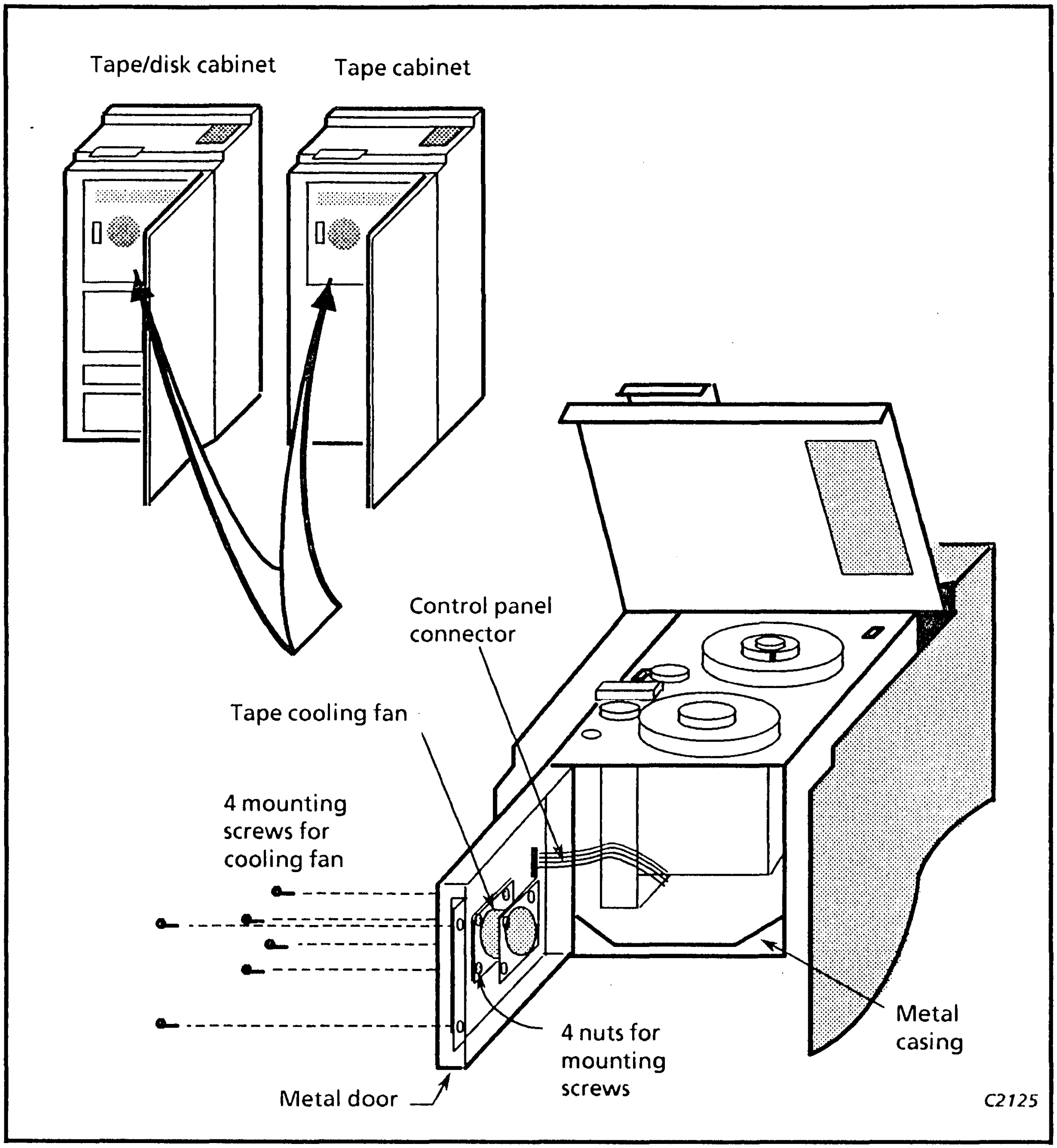
NOTE

If the new fan does not have a protective screen, remove the screen from the old fan and install it on the new unit.

8. Install the replacement fan by reversing steps 1 through 7.

9. Verify that the cooling fan is running.

Tape Cooling Fan



Procedure 17 - Air Filter

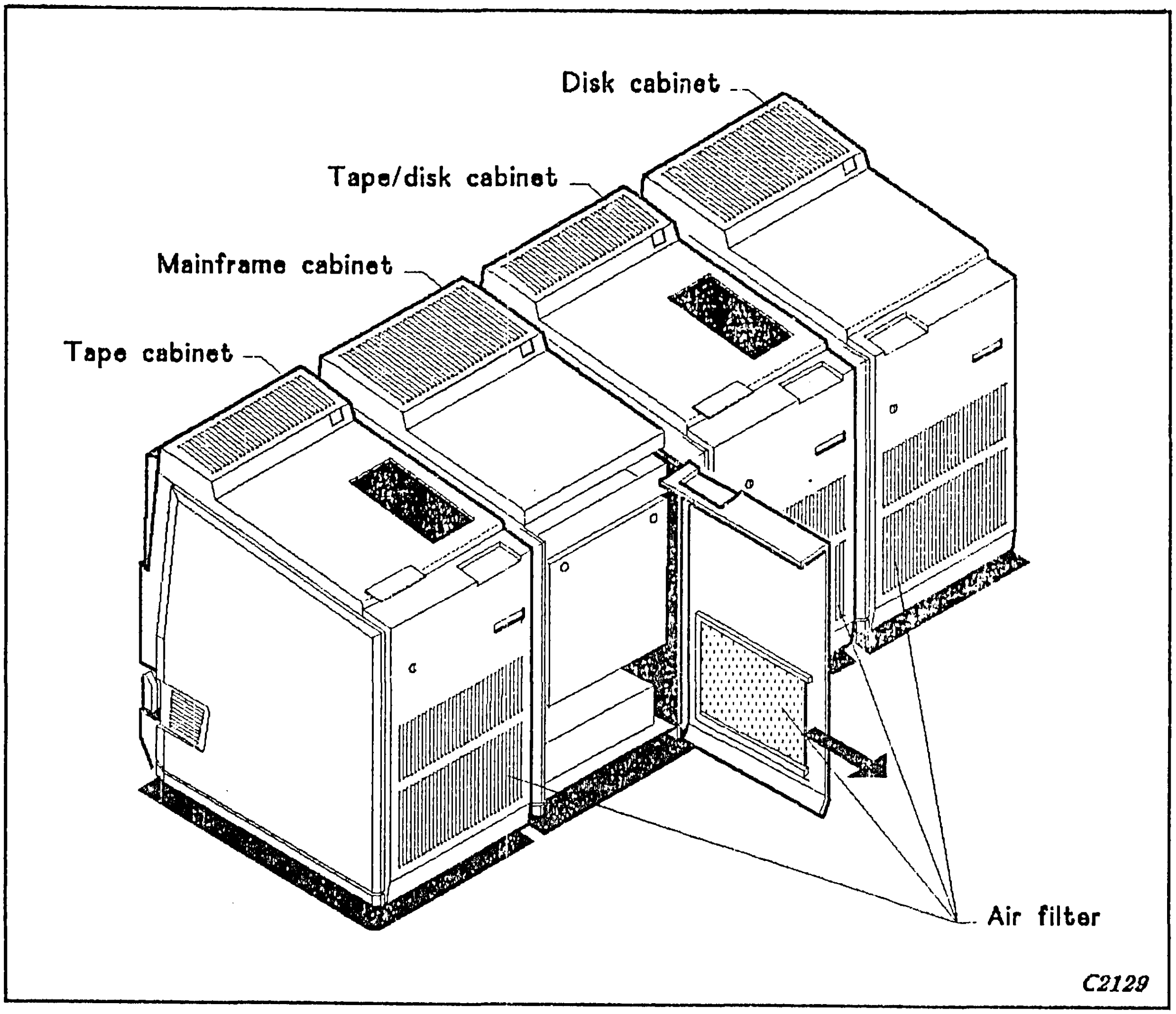
You can access the air filter from the front of all cabinets. Use the following procedure to replace or clean the air filter.

NOTE

Unless you remove and replace other assemblies, you do not have to power off the cabinet.

1. Open the front door of the cabinet.
2. Slide the air filter right out of its slot.
3. If cleaning equipment is available, clean the filter; otherwise, replace the filter.

Air Filters


Disk cabinet
Tape/disk cabinet
Mainframe cabinet
Tape cabinet
Air filter
C2129

Procedure 18 - Cables and Connectors for Peripheral Cabinets

The figures on the opposite page help you to identify the cables and connectors for a tape or disk subsystem. Before you start replacing cable, identify the correct path from the mainframe communication bulkhead to the peripheral subsystems and the internal cables in the subsystems--a customer's system has more than one disk or tape subsystem.

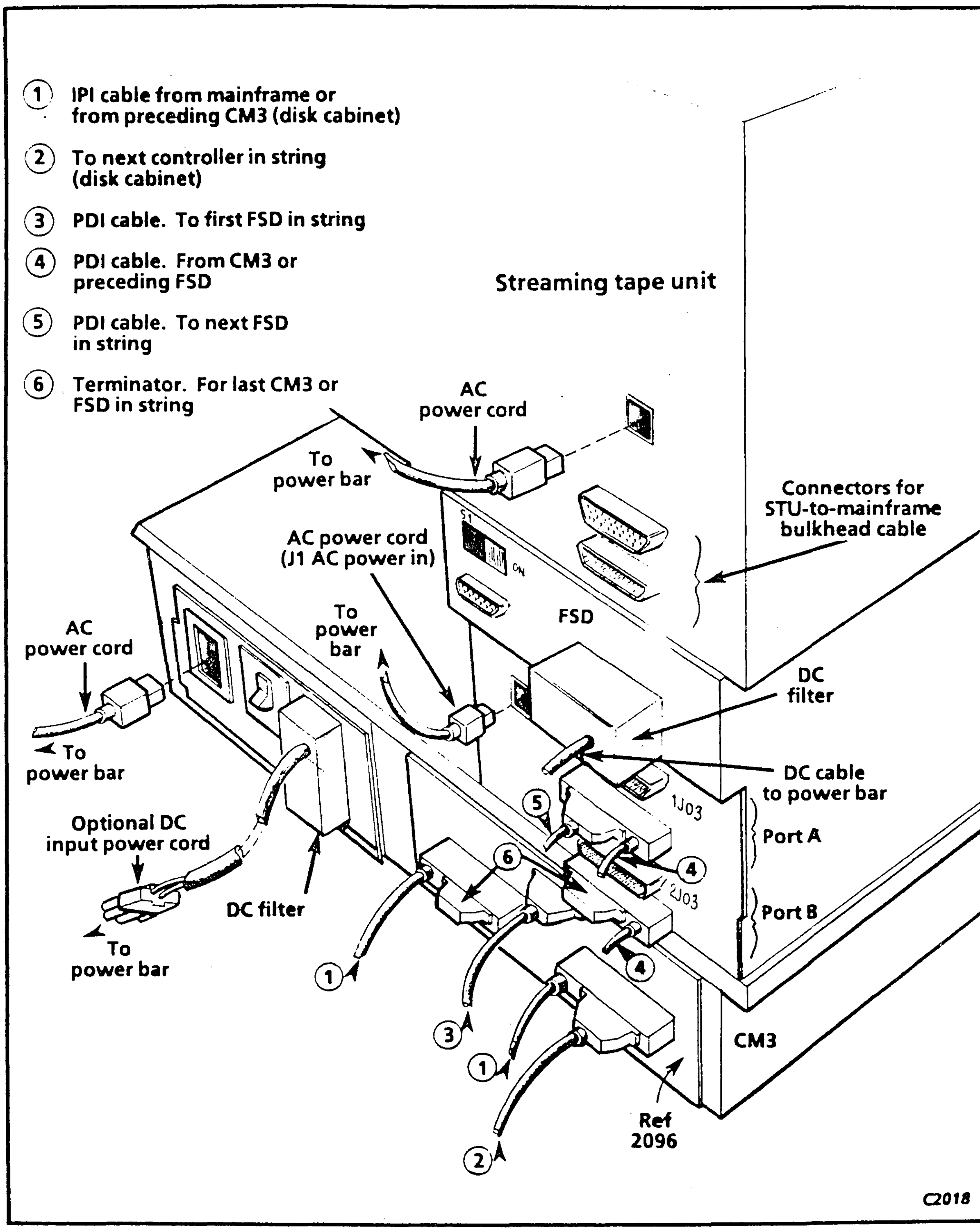
Inside the front door (in a literature holder) of each mainframe is an information package that contains the cable configuration map, identification stickers, and the cable labels. If you make a change to the cable configuration, you must attach the correct labels to the cables, inform the operator and update the cable configuration map.

For a figure of the cable configuration map, labelling scheme, and more cable information, see section 5 of the CYBER 930 Installation Guide [Control Data publication 60469530].

When you replace any cable, do the following:

- Set the service switch to OFF to power down the peripheral cabinet. To disable power from the tape cabinet only, disconnect the power cable from the wall outlet. To replace the signal cable from the mainframe to the peripheral cabinet, you do not have to power down the system.
- If a peripheral cabinet has the battery backup option, make sure you set the circuit breaker in the battery charger box to OFF before servicing and reset it to ON after servicing.
- Use a replacement cable that has the same part number and is the same length as the cable you are replacing.
- Attach the correct labels or identification stickers from the information package to each connector at both ends of the replacement cable. All IPI cables have a color label at both ends of the connectors to indicate that the cable is connected to the left or right port (blue label for left port, red label for right port) of the control module or the disk drive.
- If you need to cut the cable ties for cable replacement, you must restrap the cables with new cable ties.
- Each intelligent peripheral interface cable has a gender-mender connector at one end where another intelligent peripheral interface cable or terminator is connected to it. Before disconnecting the terminator or cable on top of the connector, dismount the entire connector.
- Tighten the retention screws on the connector to ensure firm mating of the signal pins.
- The DC power cords on the control module and the fixed storage drive for the battery backup option require special removal and replacement procedures. See procedure 20 for replacing the control module DC cable and procedure 24 for replacing the fixed storage drive DC cable.

Peripherals Cables and Connectors



Procedure 19 - Tape Control Panel

The tape control panel powers the tape subsystem on and off. It also provides status, control, and maintenance functions for the operator and maintenance personnel. Use the same procedure for the tape control panel in the tape cabinet as for the tape/disk cabinet.

Removal

1. If the computer system has another tape unit on the same channel as the tape unit you want to service, disconnect the two logic cables from the back of the tape unit being serviced. While you take the unit offline for servicing, the system still has access to the other unit.

2. Press LOGIC OFF on the tape control panel.

3. Open the cover and set the circuit breaker beside the reel to O (off).

4. Open the front door panel of the cabinet.

5. Detach the cable holding bar from the metal door by removing the two holding screws.

6. Disconnect the control panel cable connector from the metal door by removing the holding screws.

7. Remove the protective cover under the control panel by removing the three holding screws.

8. Remove the four locknuts that secure the tape control panel assembly to the front door panel. Detach the assembly.

9. Unscrew the four holding screws and the ground screw to remove the control panel from the top and bottom plates.

Replacement and Verification

1. Position the control panel replacement by reversing the removal procedure.

2. Thread the tape--do not load. Run Operator Test 01 by using the following test procedure to verify the control panel:

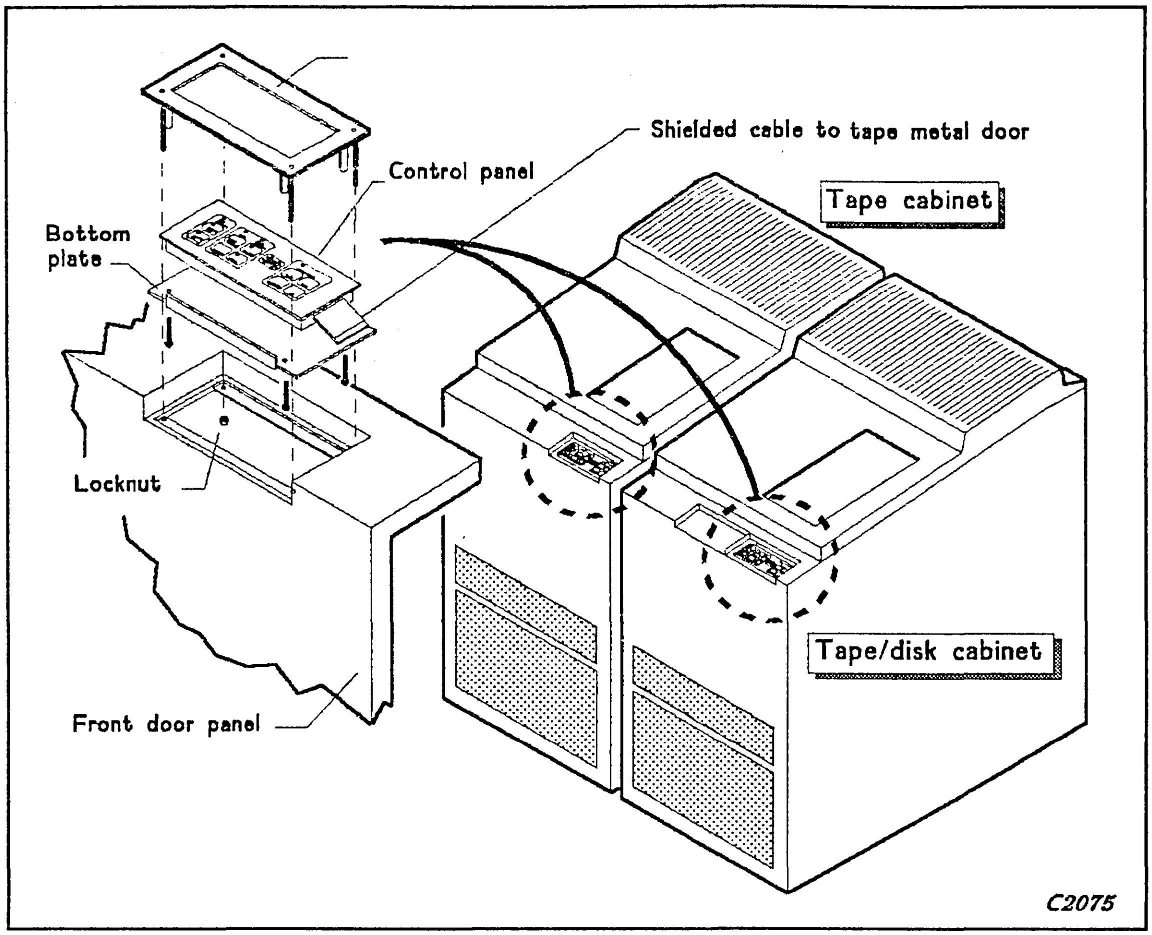
   a. Press the TEST switch on the control panel. The DIAGNOSTIC indicator lights and the display panel indicates 01.

   b. Press the EXECUTE switch to start the test. The test starts with the display panel incrementing from 00, 11, 22 through 99.

c. Verify that all segments of the numerical display are functioning. During this step, the following indicators light: FILE PROTECT, LOGIN ON, ON-LINE, RESET, and DIAGNOSTICS.

d. When the test finishes, observe that the display panel indicates 00. This test takes at least ten minutes.

Tape Control Panel



Procedure 20 - Control Module

The control module (CM) contains the following field replaceable units: main logic board, power supply, I/O connector board, fan filter, and error display assembly. Removal and replacement procedures are in subsequent pages. If you need to replace the entire control module, use the following CM removal and replacement procedure.

Control Module Replacement

1. If the cabinet has the battery backup option, set the circuit breaker to OFF and the battery charger to OFF. If the cabinet has no battery option, go to step 3.

2. Disconnect the DC power cable to the CM from the power bar.

3. Set the service switch to OFF to power off the cabinet. If you do not need to power off the whole cabinet, leave the service switch set at SYSTEM, but set the power switch at the back of the CM to O.

4. Disconnect AC power cable, I/O cables, and the terminator on the back of the CM.

NOTE

The power bar may block access to the back of the CM. To access the cables and connector, remove the two holding screws from the right side of the power bar and swing the power bar to the left. Because the power bar is not strong enough to support you weight, do not lay your arm on top of the power bar for support while disconnecting cables.

5. Remove the CM locking plates from the front of the CM. Pull the CM to the fully extended position.

WARNING

The CM weighs 16 kg (35 lb). If needed, call for help with the next step.

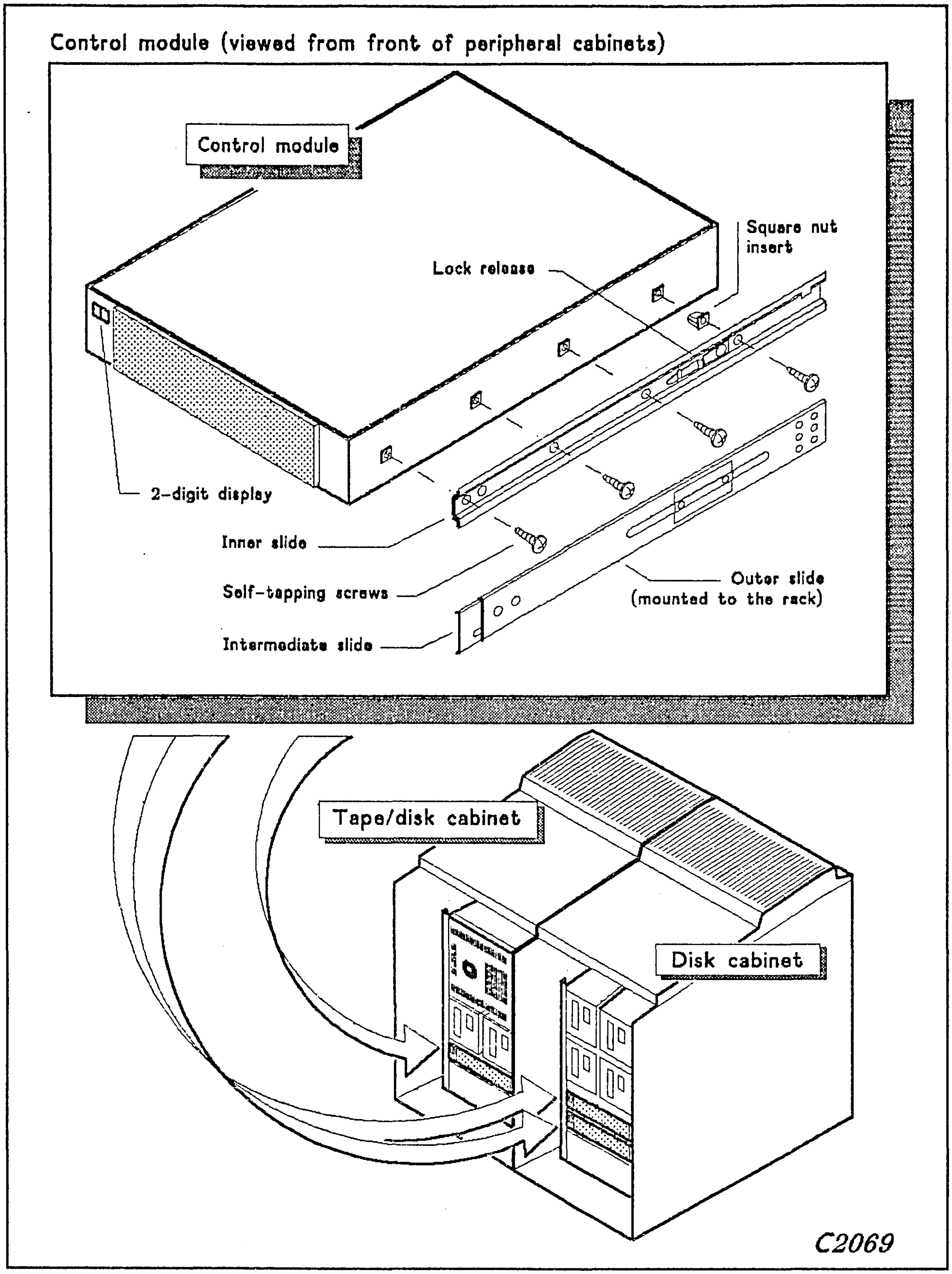
6. Press the slide lock release. Then pull the CM forward until it is free of the slide assemblies as shown in the figure.

7. Remove the self-tapping screws to detach the inner slides on both sides of the CM and install the inner slides on the new replacement CM.

8. **Ensure that the voltage setting is the same as the replaced CM.** Refer to the figure in procedure 23 for the location of the voltage select switch on the power supply.

9. If the CM has no DC power cable installed, go to step 11.

Control Module Replacement



10. Remove the DC power cable from the CM power supply and install it to the replacement CM as follows:

    a. Open the covers of both CMs.

    b. On the small rectangular cover plate of the CM power supply, loosen one screw, remove the opposite screw, and rotate the plate to expose the cutout hole.

    c. Repeat step b for the other CM power supply.

    d. From the old CM power supply, detach the cable cover to expose the plate assembly by removing the cover screw.

    e. Remove the nut, lockwasher, and insulating bushing from the DC RT1 terminal.

    f. Remove the holding screw to detach the plate assembly from the power supply.

    g. Unplug the DC power connector from the cutout hole on top of the power supply and guide the connector out through the cutout hole on the back of the power supply.

    h. On the back of the new CM power supply, remove the small rectangular DC inlet cover plate to expose the cutout hole.

    i. Remove the nut, lockwasher, and insulating bushing from the DC RT1 terminal.

    j. Remove the DC RT1 terminal stud (with a flat insulating washer) from the rear.

    k. Replace the flat insulating washer with the insulating bushing removed in step i and reinstall the DC RT1 terminal stud.

    l. Install the plate assembly with DC cable by reversing steps e through g.

    m. **Check that the DC RT1 stud is not grounding out. Check with the voltmeter for shorts across the studs (for example, GND and RT1) and to the chassis. If shorts are found, ensure that the insulators are not damaged.**

    n. Replace the cable cover and the power supply cover plate by reversing steps b and d.

    o. Install parts removed during steps h, i, and k to the old CM unit.

11. Push the intermediate slides to their fully retracted position.

12. Lift the CM into position and guide the inner slides into the intermediate slides. Push until the lock releases engage. Then pull the CM to the fully extended position.

13. Connect power cables, I/O cables, and terminator to the CM panel. Make sure you set the power switch to ON at the back of the CM.

Verification

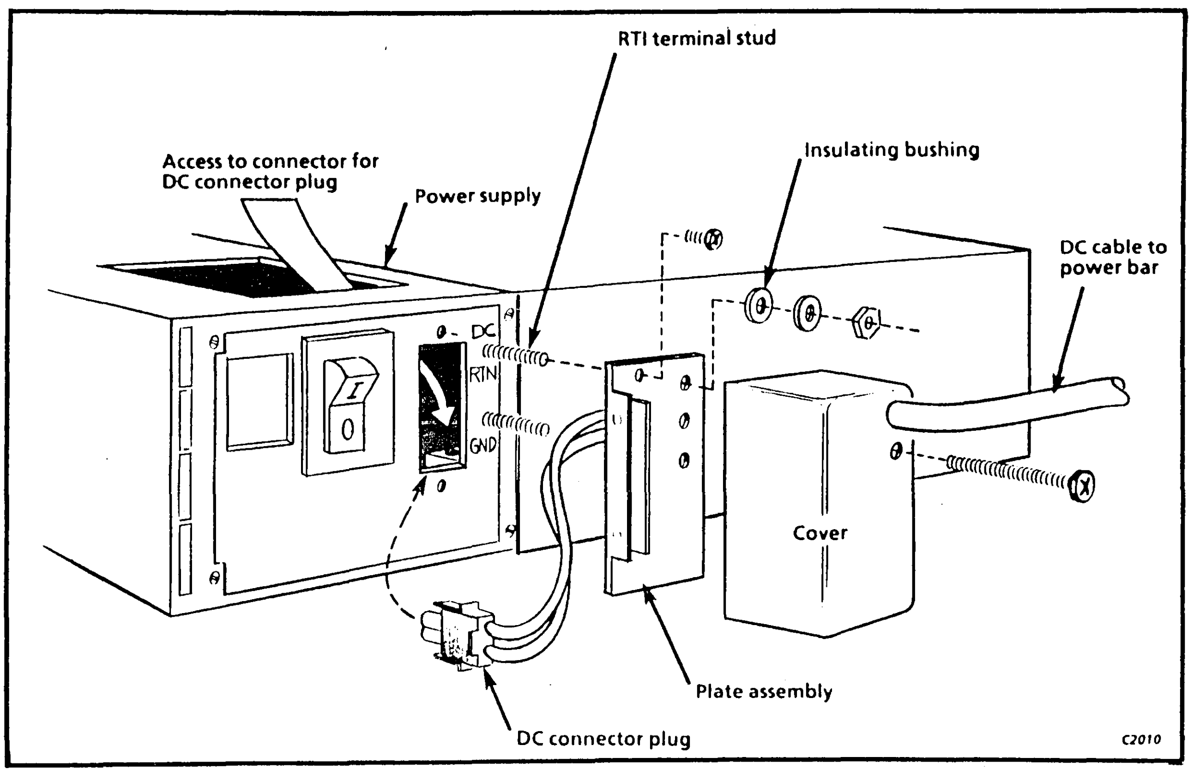
1. Set the service switch to ON to power on the cabinet and to start the self-diagnostic test on the CM.

2. Observe the indicator display in front of the CM. If the display indicates **00** after the test, the problem is fixed.

3. Set the service switch to SYSTEM.

4. Reload CM microcode from CIP tape according to section 5 module, Installing or Updating CM3 Microcode. The CIP tape used must be at the same level that the system has installed.

DC Cable Replacement



Procedure 21 - Main Logic Board and I/O Panel Assembly

The replacement procedures assume the following:

- You remove the control module from the cabinet according to procedure 20 and place it on a flat surface with the top cover removed as shown in the figure opposite;
- You take the electrostatic discharge precautions when performing the procedures;
- Repair verification is the same as the control module verification procedure.

Main Logic Board Replacement

1. Loosen the captive recessed screw with a 4-mm (5/32-in) hex wrench. Refer to the figure for the screw's location.

2. Disconnect plugs P30 (to the power supply) and P1 (to the error display) from the board.

3. Grasp the handle and pull the board away from the I/O panel connector. Lift the board out.

4. Set the eight toggles of switch SWP1 on the replacement board to the same positions as the old board removed in step 3. Make sure that switch 8 is set to OPEN or OFF to enable sweep cycle.

5. Install the replacement board by slowly sliding it through its supports and against the I/O panel connector. When contact is made, tighten the captive screw so that it pulls the board into the connector.

6. Reconnect the plugs to the board.

7. Reload CM microcode according to section 5 module, Installing or Updating CM3 Microcode. The CIP tape used must be at the same level that the system has installed.

I/O Panel Assembly Replacement

1. Remove the main logic board as directed in the above procedure and place it in an antistatic bag.

2. Disconnect all cables and terminators from the I/O panel. Label the cables for easy reconnection.

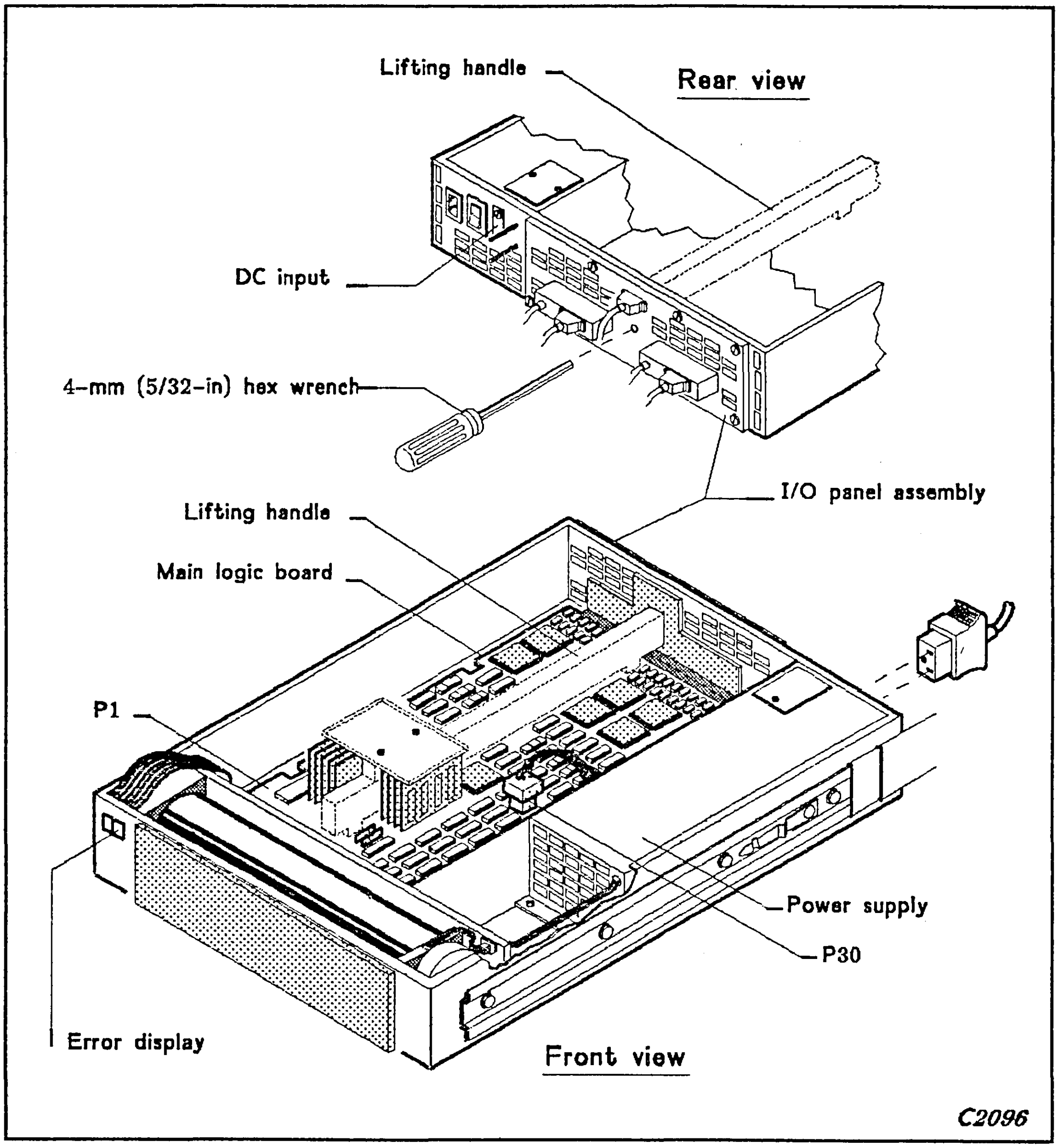
3. Loosen the seven captive screws on the face of the I/O panel and remove the panel.

4. Install the replacement I/O panel, but do not tighten the screws fully.

5. Reinstall the main logic board by slowly sliding it through its supports and against the I/O panel connector. When contact is made, tighten the captive screw so that it pulls the board into the connector.

6. When the main logic board is fully seated, tighten the I/O panel screws.

Main Logic Board and I/O Panel Replacement



Procedure 22 - Control Module Air Filter, Error Display, and Fan

Except for the air filter replacement procedure, which does not require that you power the unit off or verify repair, the replacement procedures for the error display and the fan assume the following:

- Power is removed from the control module;
- The control module is in fully extended position and the top cover is removed;
- You take the ESD precautions when performing the procedures;
- Repair verification is the same as the control module verification procedure.

Refer to the figure opposite during the replacement procedure.

Air Filter Replacement

Remove the air filter of the control module by peeling the air filter from the Velcro tape. If a new filter is available, always replace it. If necessary, clean the filter by washing it in a solution of water and mild detergent. Rinse thoroughly and install the filter when it is dry.

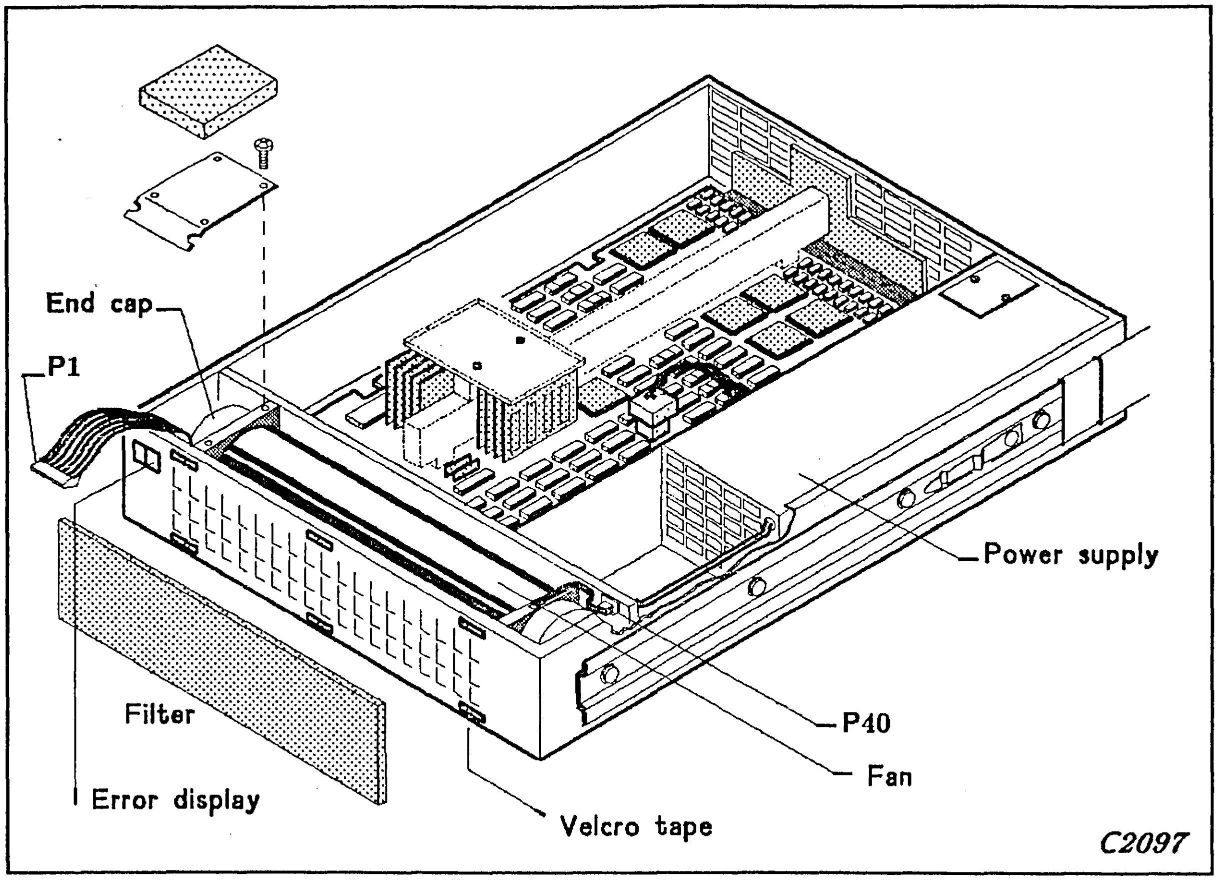
Error Display Assembly Replacement

1. Disconnect plug P1 from the error display to the main logic board.
2. Remove the error display assembly by removing its holding screws.
3. Reverse steps 1 and 2 to replace the new assembly.

Fan Replacement

1. Disconnect plug P1 from the error display to the main logic board.
2. Disconnect plug P40 from the power supply.
3. Remove screws, three on each side, from the fan. When removing the screws on the left side, take care not to bend or damage pins at connector P1 on the main logic board.
4. Remove the fan and parts as shown in the figure. Install them on the new fan.
5. Install the new fan in the control module cabinet by reversing steps 1 through 3. Secure the end cap on the fan with tie wrap.

Control Module Air Filter, Error Display, and Fan Replacement



Procedure 23 - Control Module Power Supply

The replacement procedure assumes the following:

- You take the electrostatic discharge precautions when performing the procedures;
- Repair verification is the same as the control module verification procedure.

Replacement

1. Remove the control module (CM) from the cabinet according to steps 1 through 5 of procedure 20 and place the CM on a flat surface.

2. Open the top cover of the CM.

3. Disconnect plug P40 to fan and plug P30 to main logic board.

4. Remove the two nuts at the front.

5. Remove the screw on the left side.

6. Remove the four screws at the rear.

7. If the power supply has no DC power cable installed, go to step 9.

8. Refer to the next two figures on subsequent pages to remove the DC power cable from the CM power supply as follows:

   a. On the small rectangular cover plate of the CM power supply, loosen one screw, remove the opposite screw, and rotate the plate to expose the cutout hole.

   b. Repeat step a for the replacement CM power supply.

   c. From the CM power supply you are replacing, detach the cable cover to expose the plate assembly by removing the cover screw.

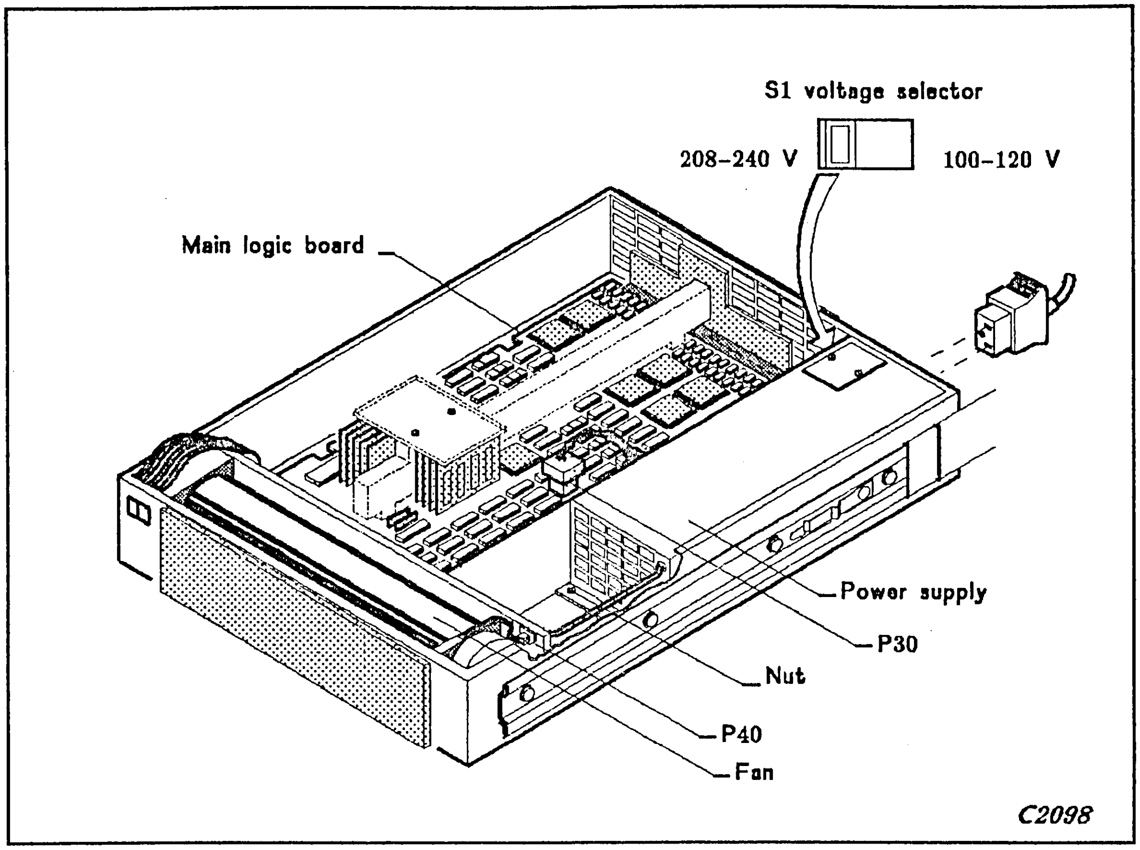
   d. Remove the nut, lockwasher, and insulating bushing from the DC RT1 terminal.

   e Remove the holding screw to detach the plate assembly from the power supply.

   f. Unplug the DC power connector from the cutout hole on top of the power supply and guide the connector out through the cutout hole on back of the power supply.

9. Lift out the power supply. **Make sure you set switch S1, shown in the figure, on the power supply replacement to the same voltage range as the old supply.**

Control Module Power Supply Replacement



10. If you do not install the DC power cable, skip steps 11 and 13.

11. Install an insulating bushing to the RT1 terminal stud as follows:

    a. From the back of the new CM power supply, remove the small rectangular DC inlet cover plate to expose the cutout hole.

    b. Remove the nut, lockwasher and insulating bushing from the DC RT1 terminal.

    c. Remove the DC RT1 terminal stud (with the flat insulating washer) from the rear.

    d. Replace the flat insulating washer with the insulating bushing removed in step 11b and reinstall the DC RT1 terminal stud.

12. Install the CM power supply by reversing steps 3 through 6.

13. Install the DC power cable to the power supply as follows:

    a. Install the plate assembly with DC cable by reversing steps 8 d through 8 f.

    b. **Check that the DC RT1 stud is not grounding out. Check with the voltmeter for shorts across the studs (for example, GND and RT1) and to the chassis. If shorts are found, ensure that the insulators are not damaged.**

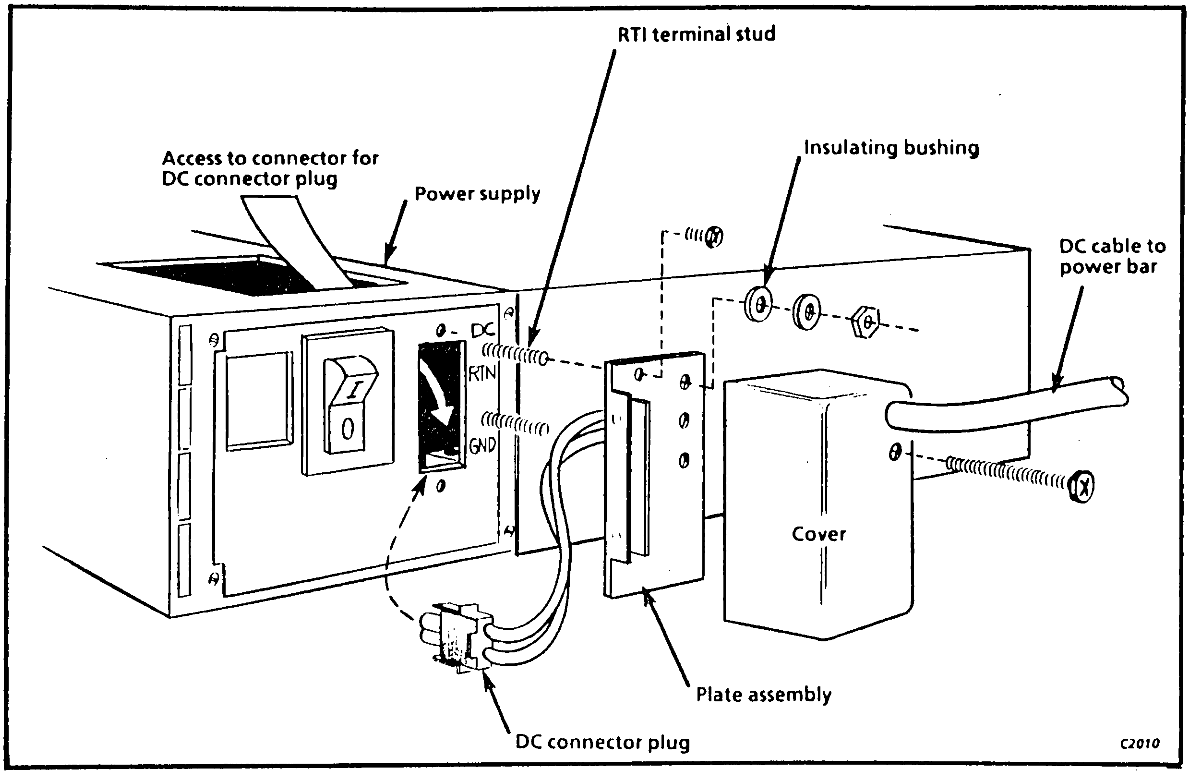
    c. Replace the cable cover and the power supply cover plate by reversing steps 8 a and 8 c.

    d. Install parts removed from steps 11a, 11b, and 11d to the old CM power supply.

14. Install the CM top cover.

15. Install the CM in the cabinet and verify operation of the power supply according to steps 10 through 15 of procedure 20.

DC Cable Replacement



The following procedure requires two persons to lift the drive onto and off of the cabinet slide assemblies. In this procedure, you can remove power either from the entire cabinet or from the fixed storage drive (FSD) only.

Removal

WARNING

Before proceeding with the removal, you must pull the stablizer bars to the outward position. The stablizer bars are at the bottom of the cabinet.

1. Press the START switch (to release the FSD from its start position) to remove power from the drive. After the READY indicator stops flashing, set the S1 switch on the power supply to OFF. If you want to power off the cabinet, set the service switch on the AC distribution rack to OFF.

2. If the cabinet has the battery backup option, set the circuit breaker on the battery charger box to OFF.

3. Disconnect the DC power cable to the FSD power supply that you want to replace from the power bar.

NOTE

If the power bar prevents you from doing the following steps, loosen the holding screws on the right-hand side and swing the bar out to the left for more opening space. Refer to the figures on the next three pages during the following steps.

4. Disconnect the AC power cable from the AC input connector J1 on the FSD power supply.

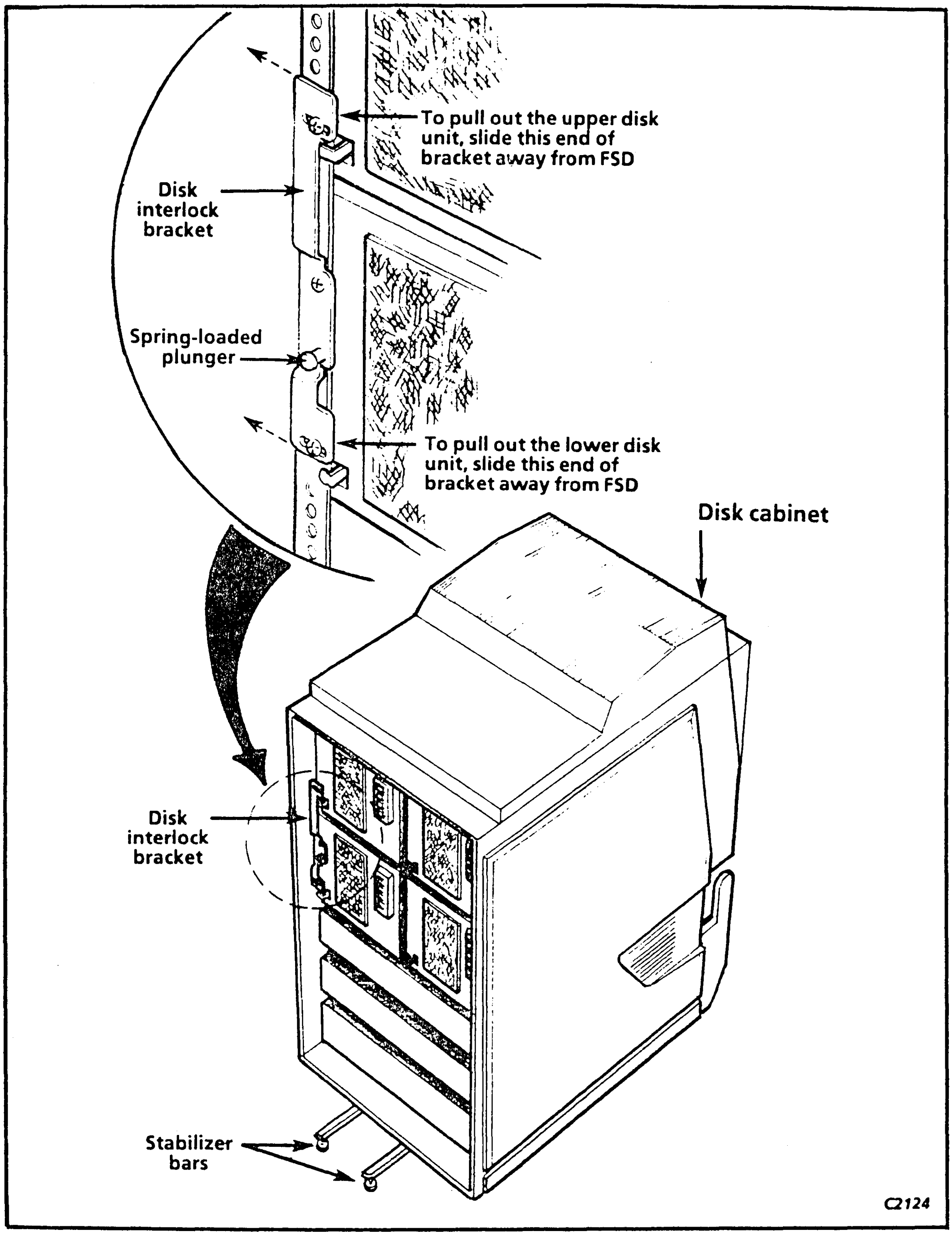
5. Loosen the thumbscrews and disconnect the external I/O cables from the FSD power supply.

NOTE

If the FSD is in the tape/disk cabinet, skip step 6. Only the FSDs in the disk cabinet have the interlock brackets.

6. At the front of the FSD, press the spring-loaded plunger on the disk interlock bracket to release the plunger to the outward position. Slide the end of the bracket away from the FSD.

Fixed Storage Drive with Interlock Bracket



7. Remove the FSD locking plates from the front of the FSD.

8. Lift the cabinet latch on the FSD and pull the drive to the fully extended position.

9. With the helper holding the drive, press the slide lock releases and pull the drive forward until it is free of the slide assemblies.

10. Move the drive to the desired location.

11. Remove the logic plug on the FSD control panel and install it to the replacement unit.

12. If DC power cable is installed, remove it from the power supply and install the DC cable to the replacement unit as follows:

    a. Detach the DC filter box by removing the two holding screws.

    b. Unplug the DC connector from J2.

    c. Install the cable to the replacement unit by reversing steps a and b.

Replacement and Verification

1. Push the intermediate slides on the equipment rack to the fully retracted positions inside the outer slides.

2. With the helper, lift the drive into position in front of the rack and guide the inner slides into the intermediate slides.

3. Push the drive in until the lock releases engage. Then push the drive to the closed position in the rack. If the drive will not go in, lift the cabinet latch and try again.

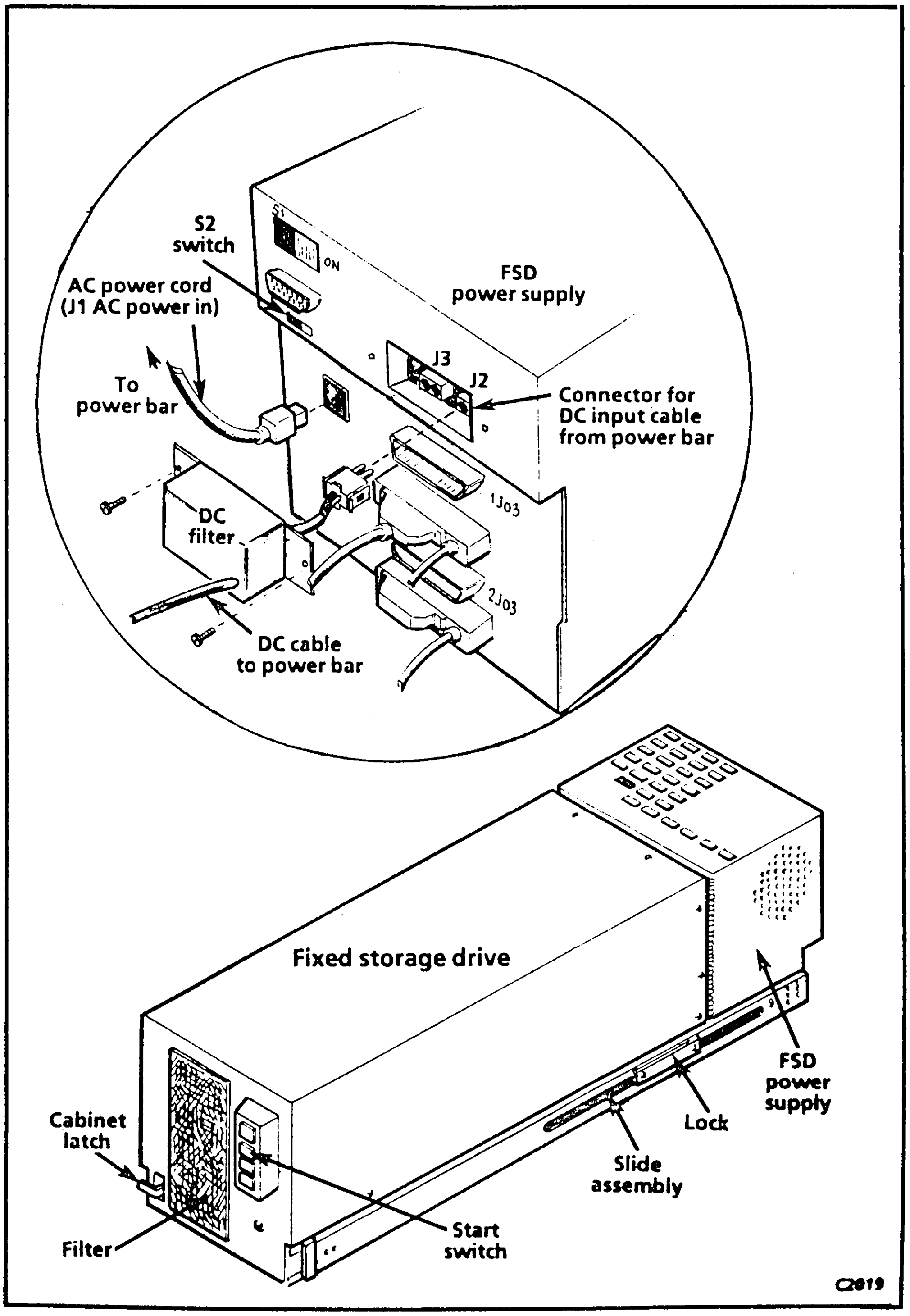
4. **Make sure that you set the S2 switch on the FSD to the same setting as the unit that was replaced.**

5. Reconnect all power and external I/O cables and power up the cabinet by reversing removal procedure steps 1 through 6. Set the service switch to ON.

6. Set the on/off switch on the control module that controls the FSD to OFF and then ON to initiate the control module diagnostics and drive diagnostics. Both displays on the CM and FSD should be 00 after diagnostics end.

7. Set the service switch to SYSTEM.

Fixed Storage Drive



Procedure 25 - Streaming Tape Unit

At least two persons are needed to remove or install the streaming tape unit (STU). Before installation, you must set the replacement streaming tape unit to the correct input voltage.

Removal

1. If the computer system has another tape unit on the same channel as the tape unit you want to service, disconnect the two logic cables from the back of the tape unit being serviced.

2. Unload the tape. Set the circuit breaker on top of the tape deck to OFF and unplug the power cord(s) from the wall outlet or power bar.

3. Open the front door. Remove the door by lifting it up from its two hinges and place the door on the left side of the cabinet.

4. Remove the holding screws to open the metal door.

5. Remove the six holding screws to remove the top cover of the cabinet.

6. Remove the holding screws and nuts to disconnect the tape control panel connector from the metal door as shown in the figure opposite.

7. Use the following procedure to place the streaming tape unit of a tape/disk cabinet in the maintenance position. **For a streaming tape unit in a tape cabinet, follow steps d through f only.**

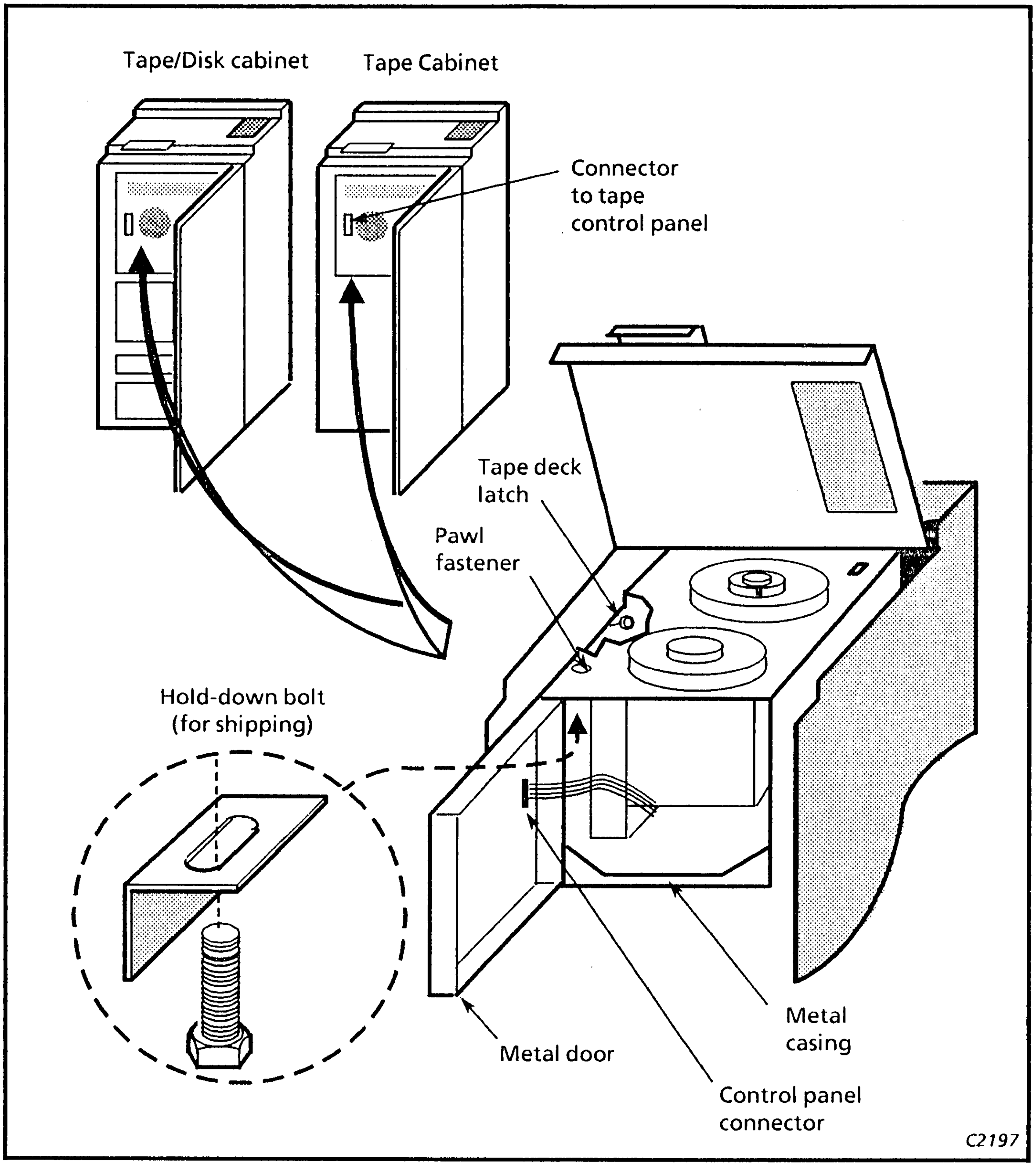
   a. Pull out the stabilizer bars.

   b. Pull the fixed storage drives to the fully extended position to make room so that you can swing the streaming tape unit up. For this step you may have to power off the cabinet and disconnect all the cables from the back of the fixed storage drives.

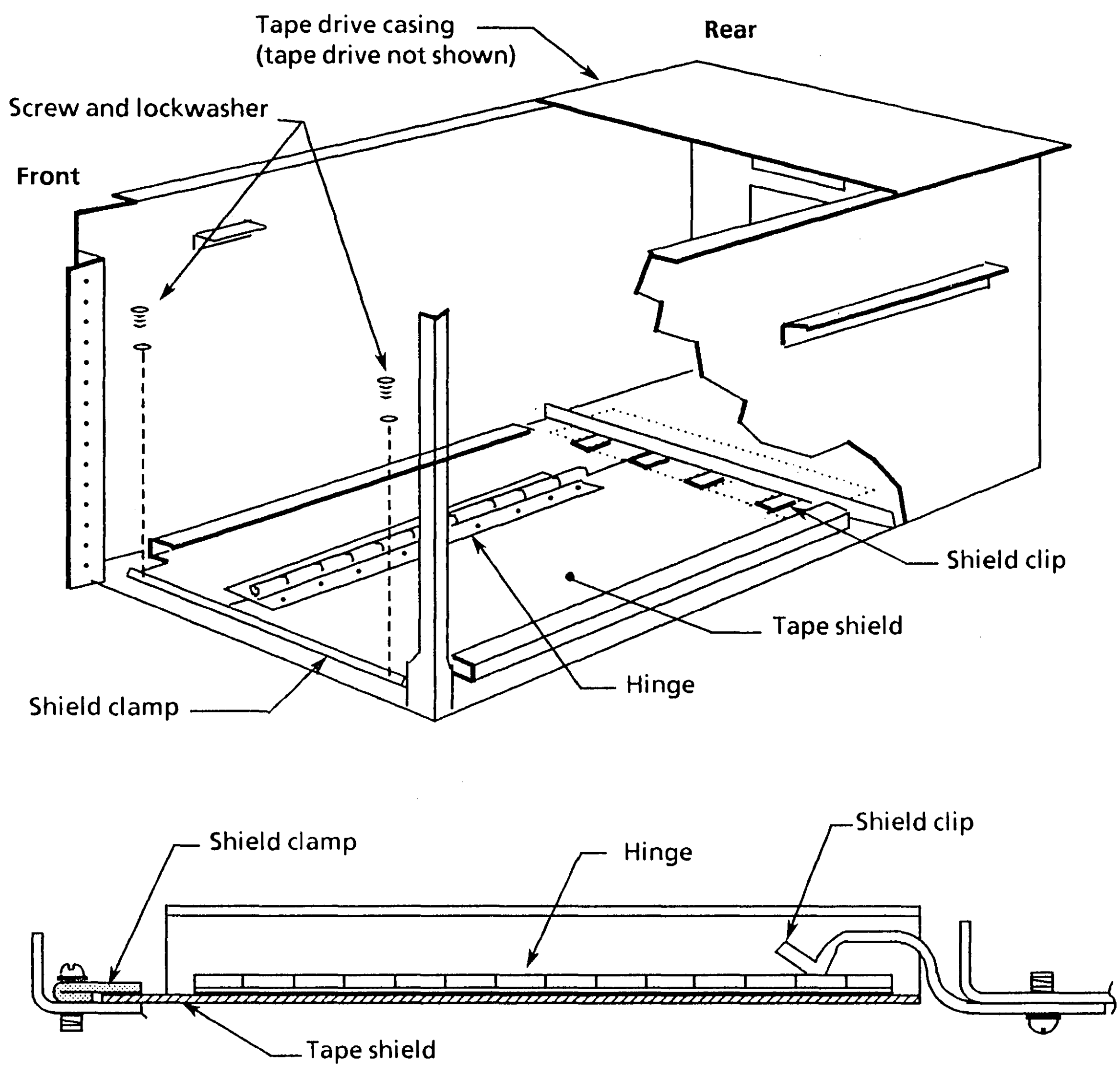
   c. Check inside the top left corner of the tape unit, behind the interlock switch, for a shipping hold-down bolt as shown in the figure on the next page.

      If there is no hold-down bolt, proceed to next step. If a hold-down bolt is there, remove it with a 10-mm (3/8 in) socket wrench and discard the hold-down bolt.

Streaming Tape Unit - Front View



Tape Shield



Side view of tape shield

d. Remove the tape shield between the tape unit and the fixed storage drive as follows:

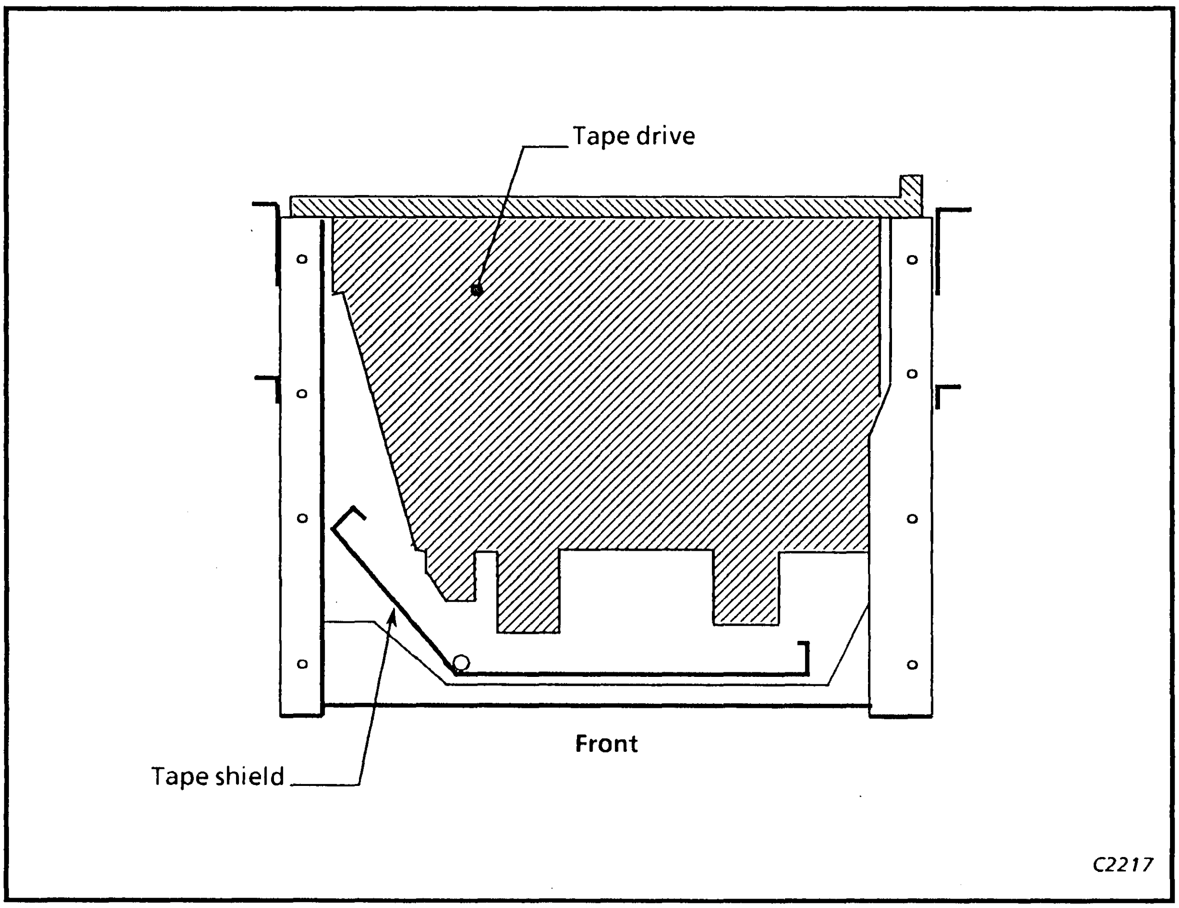
- Remove the shield clamp by removing the two sets of screws and lockwasher. See figure, Tape Shield, for shield clamp location.

- Lift the tape shield and pull it forward until its end is disengaged from the shield clip that is at the back of the tape drive casing.

- Fold the tape shield at an angle as shown in the following figure and take the tape shield out.

e. Using a straight-slot screwdriver, rotate the pawl fastener on the lower left side of the tape deck a half turn counterclockwise to release the tape deck.

Tape Shield Removal



f. While pressing down on the front of the tape deck with your right hand, pull the ring of the spring-loaded tape deck latch on the pivot bracket with your left hand. With the latch handle extended, pull the tape deck upward and allow the front of tape deck to rise.

g. Release the tape deck latch and swing the tape deck up until the latch engages and the tape deck locks in the vertical position.

8. Disconnect the ground wire, two interface cables, and the power cord from the streaming tape unit (STU).

CAUTION

Before dismounting the STU, push the cabinet against the wall to avoid any movement.

9. Remove the holding screws and caps of both pivot brackets.

WARNING

The STU weighs about 50 kg (110 lb). Two or more persons are required to dismount it. Lift it by the tape deck to avoid damage to the logic boards.

10. While holding the tape deck, move the STU toward the rear of the cabinet to disengage the STU from the pivoting bolts. Lift the STU out of the cabinet.

Replacement

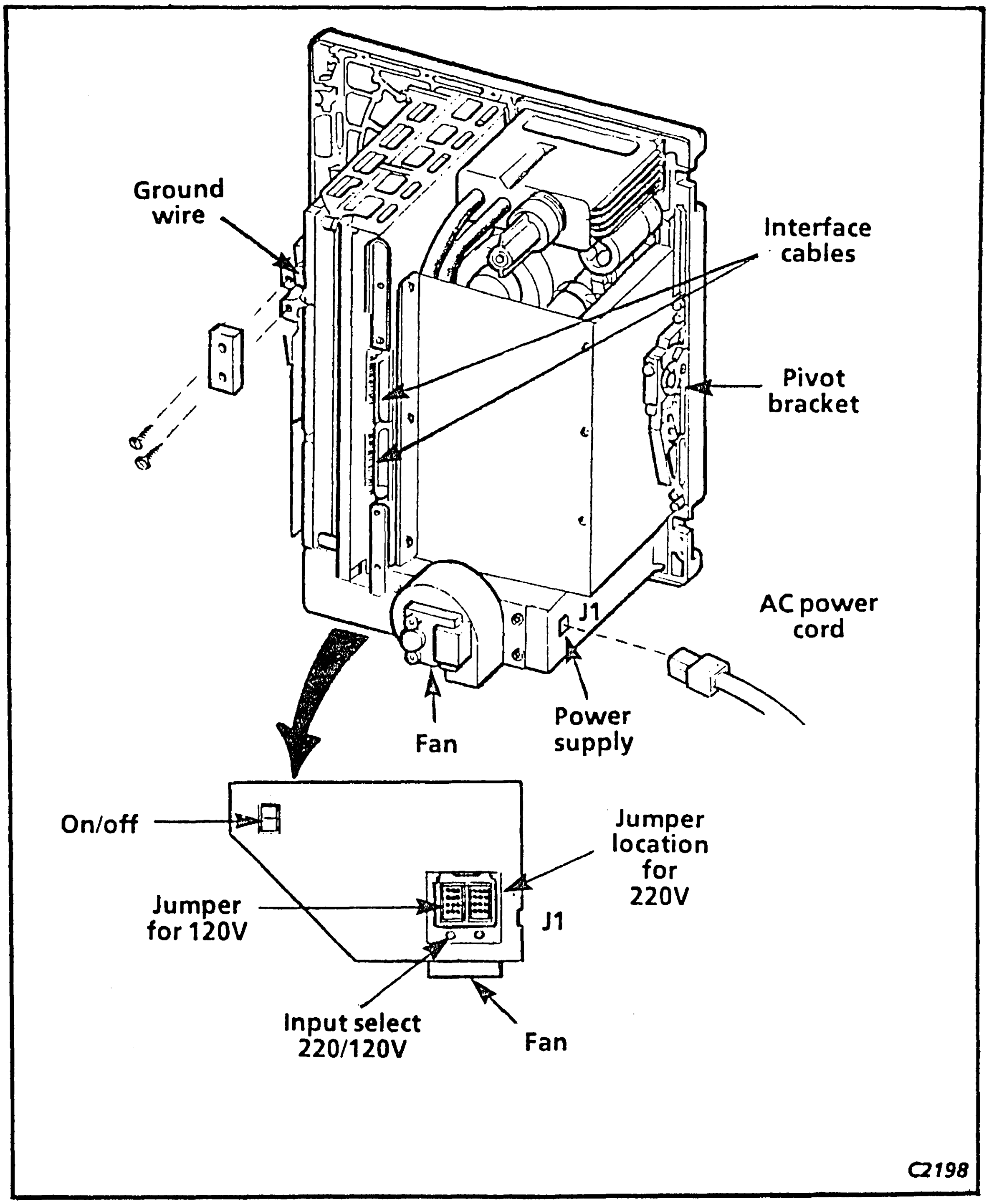
1. Set the ON/OFF switch of the replacement unit to ON as shown at the bottom of the figure opposite.

2. Remove the input select cover from the power supply of the replacement STU. Ensure that the jumper corresponds to the input voltage on the equipment identification plate or is the same as the STU replaced.

3. If the replacement STU does not have pivot brackets, remove the pivot brackets from the old one and install them on the new STU.

4. Reverse removal steps 1 through 10 to install the STU.

Streaming Tape Unit Replacement



Replacing the System Console

The system console has three hardware units: the keyboard, the color monitor, and the central computing unit (CCU). An optional printer or a modem can also connect to the console. Individual hardware units or peripherals can be replaced by disconnecting the cable from the central computing unit. However, if you replace the central computing unit, you need to park the read/write heads of the hard disk to a safe location for subsequent transportation of the central computing unit.

CCU Replacement

NOTE

Replace the CCU only when you are in an emergency situation and a spare CCU is available. You can further isolate the CCU to the subassembly level by using the console diagnostics and the Zenith Service Guide [Control Data publication SMD 41621164].

1. Return to the main menu or press <Ctrl Alt Del> and <Esc>. If you are unable to reboot the console, go to step 4.

2. Type **S** to select Shut Down Console. The following message appears:

   This utility will force the console hard disk to be PARKED
   NO FURTHER OPERATION IS THEN POSSIBLE
   Press Y to continue, or any other key to abort.

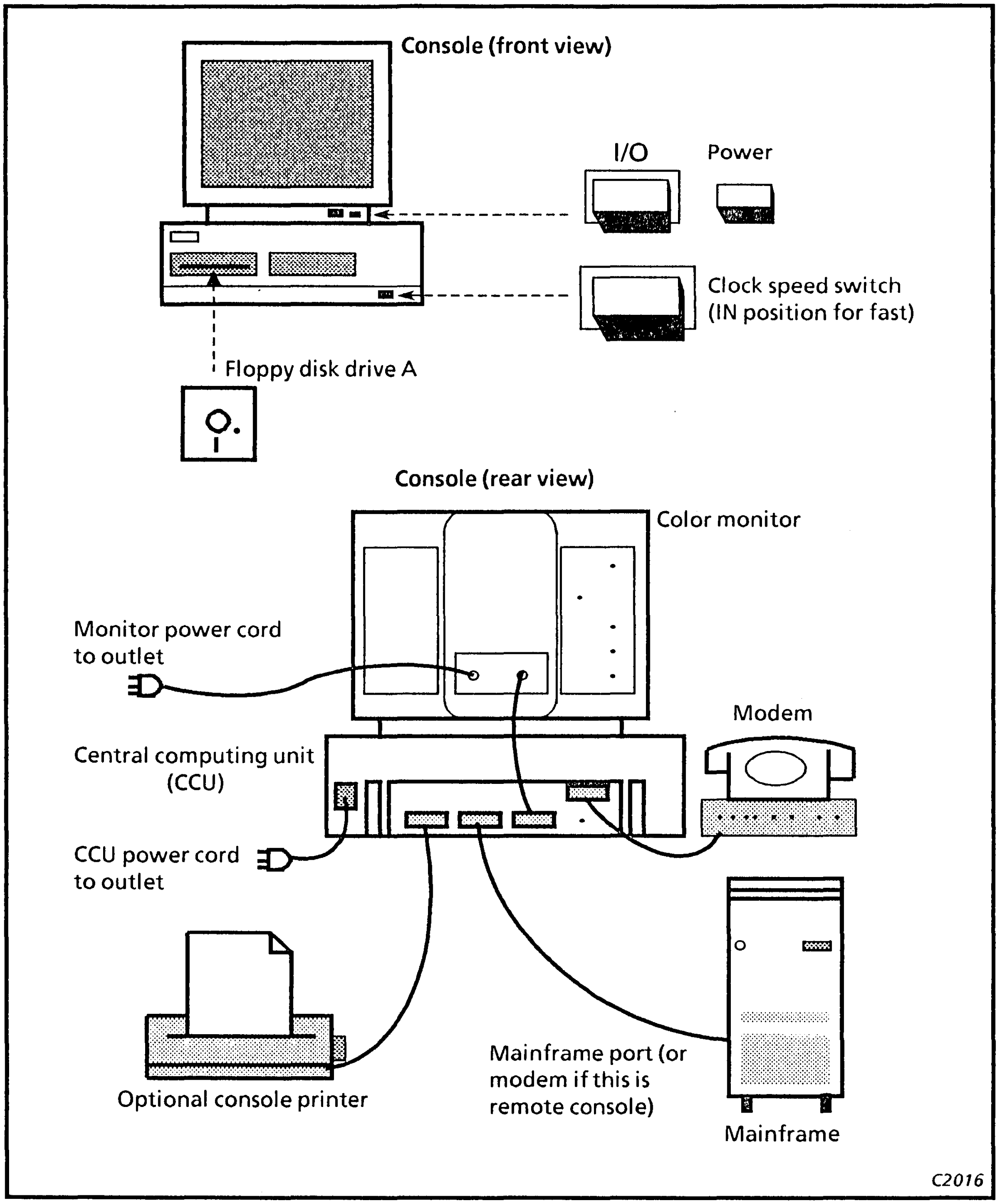
3. Press **Y** to park the hard disk.

4. Power off the monitor, the console peripherals, and the central computing unit.

5. Remove all cables from the central computing unit and install them on the replacement central computing unit.

6. Install the console software according to the next module, Installing Console Software.

System Console Connections



If you replace the console or the hard disk in the console, you must reinstall the console software according to the eight major steps below. If you only update the console software, refer to section 5 module, Updating Console Software.

You must install the software and the remote console program files on the remote console that is used for technical assistance. Refer to the CYBER 930 Computer System Remote Console Installation Guide [Control Data publication 60469555] for the installation procedure.

1. Prepare the Console for Software Installation

a. With the console turned on, press <Ctrl Alt Ins>. The console displays a sign-on message as follows:

   MFM-140 Monitor, Version *X.X*
   Memory Size: 640K bytes
   Enter ? for help.
   –>

b. Insert MS-DOS Distribution Disk 1, close the latch, then type **BF** and press <Return>. The console prompts for the date.

c. Enter the date in the format mm-dd-yy and press <Return>. The console prompts for the time.

d. Enter the time in the format hh:mm and press <Return>. The console displays an MS-DOS sign-on message plus the prompt **A>**.

2. Format the Hard Disk

a. If the MS-DOS Distribution Disk is version 3.1 or earlier, go to step b. If the MS-DOS Distribution Disk is version 3.2 or later, enter the following sequence to remove the hard disk format protection:

DSKSETUP	to display the current disk configuration and partition assignment
C	to change the hard disk format protection
A	to select hard disk drive 0
A	to disable format protection
B	to return to the main menu
D	to exit the DSKSETUP utility

b. Enter **FORMAT C: /S** and press <Return>. The console displays the following:

FORMAT Version *X.XX*
will format partition assigned to drive C
Press RETURN when ready

c. Press <Return> to start formatting the hard disk. After several minutes, the following displays:

Enter desired volume label (11 characters,
RETURN for none)?

d. Type **CONSOLE** and press <Return>. The following message appears:

```
21204992  bytes total disk space
   63448  bytes used by the system
21204992  bytes available on disk

A>
```

3. Install MS-DOS Files in the MS-DOS Directory

a. Enter **C:** and press <Return>.

b. Enter **MD\ MSDOS** and press <Return>.

c. Enter **CD\MSDOS** and press <Return>.

d. Enter **COPY a:*.*** and press <Return>. All MS-DOS files from the diskette copy to the MS-DOS directory.

e. Remove MS-DOS Distribution Diskette 1 from disk drive A and insert disk 2 into disk drive A.

f. Enter **COPY a:*.*** and press <Return>. All MS-DOS files from diskette 2 copy to the MS-DOS directory.

g. Remove diskette 2 from disk drive A.

4. Install the Console Operating Software Diskettes in the Directory CONSOLE

a. Insert the 930/932 Local Console Diskette 1 into disk drive A. Close the drive latch.

b. Enter **A:INSTALL** and press <Return>. The console displays the message shown on the next page:

To proceed: Press return (CR) at the next prompt, OTHERWISE

To terminate: Press ESC or CTRL BREAK.

Console Disk #1 CDC P/N 19?????? must be in Disk Drive A:

This procedure takes about 4 minutes to build the CONSOLE software. Please do not interrupt this process.

Press RETURN to continue . . . ESC to abort

c. Make sure that the console diskette 1 part number (P/N 19??????) is the same as shown in the console display and press <Return>. The system transfers files from the diskette to the hard disk CONSOLE directory. When finished, it prompts you to insert the next diskette.

d. Follow these prompts until all console diskettes have been processed. Because the console software is distributed in compressed form, the console goes into an uncrunching routine to return the software to normal form. When the uncrunching is done, the console displays the message:

Console Software L??? Now Installed.

5. Install the Proprietary Software in the Directory CONSOLE

a. Insert the 930/932 Console Proprietary Software diskette in disk drive A. Close the drive latch.

NOTE

The mainframe must be connected to the console and the mainframe power must be ON. The installation process reads the mainframe serial number to proceed.

b. Enter ISOLATE and press <Return>.

c. Select the menu item Install Isolation Privileges and press <Return>.

6. Install Console Data Files in the Directory CONSOLE

The console data files reside on several diskettes labeled *930/932 Console Data Disk n*.

a. Insert the *930/932 Console Data Diskette 1* into disk drive A and close the drive latch.

b. Enter **A:INSTALL** and press <Return>. The console displays the following message:

To proceed: Press return (CR) at the next prompt, OTHERWISE

To terminate: Press ESC or CTRL BREAK.

Console Disk #1 CDC P/N 19?????? must be in Disk Drive A:

This procedure takes about 4 minutes to build the CONSOLE software. Please do not interrupt this process.

Press RETURN to continue . . . ESC to abort

c. Make sure that the file disk 1 part number (P/N 19??????) is the same as shown in the console display and press <Return>. The system transfers files from the floppy diskette to the hard disk. When finished, it prompts you to insert the next diskette.

d. Follow these prompts until all data file diskettes have been processed. Because the console software is distributed in compressed form, the console goes into an uncrunching routine to return the software to normal form. When the uncrunching is done, the console prompts you to update backup/recovery diskette.

7. Create Recovery or Backup Diskettes

Console software includes two backup or recovery diskettes. Update the second diskette with files from installation performed in step 6. After the second diskette is updated, you can use the backup recovery/backup diskettes 1 and 2 as a floppy-based system when a hard disk failure occurs.

a Remove the write protect tab on the second diskette marked Backup/Recovery Operating Software.

b. Follow the prompt to insert the second diskette and close the drive latch.

c. Press <Return> to copy the data tables to the recovery diskette.

d. When the copy is complete, remove the diskette, replace the write protect tab, and return it to its envelope for safe keeping.

e. When the message: **Console Software Now Installed** appears. press <Return> to reboot the console and display the Console Main menu.

8. Set Up the Specify Hardware Options Menu

a. Open the front door of the mainframe and get the cable configuration map from the literature holder.

b. Enter the following sequence to select the Specify Hardware Options menu:

M to select Maintenance from the Console main menu
E to select Engineering Tasks
S to display the Specify Hardware Options as shown below

Specify Hardware Options Menu

```
                *** SPECIFY HARDWARE OPTIONS ***

                93?-??     Model #   ?      Serial #   ?

                                                               |  CH #
SLOT #  |   PAK                    SLOT #  |   PAK             |  (octal)
  01    | MEM 1                      15    | UNUSED SLOT       | --
  02    | MEM 3                      16    | 170 ADAPTER       | --   --
  03    | MEM 0                      17    | ICA ADAPTER       | --
  04    | MEM 2                      18    | ICA ADAPTER       | --
  05    | CPU0 C                     19    | ISMT ADAPTER      | --
  06    | CPU0 B                     20    | ISMT ADAPTER      | --
  07    | CPU0 A
  08    | CLOCK
  09    | PAGE MAP
  10    | PPUS 00-04
  11    | PPUS 20-24
  12    | CHANNELS 00-05
  13    | CHANNELS 20-25
  14    | TPM/MAC
```

c. Enter the channnel number(s) for each adapter specified in the cable configuration map into slots 15 through 20 of the Specify Hardware Options menu.

To enter the required pak and channel number for a slot, press < return >s until the designated pak type or channel number appears.

d. Press <F3> to save the contents and exit.

e. Return the cable configuration map to the literature holder and close the front door of the mainframe.

SECTION 4

FIELD REPORTING AND PARTS HANDLING

Reporting Maintenance Activities by MAF

You must report, on the Maintenance Activity Form (MAF), **all** maintenance performed on the computer system. When replacing a mainframe logic pak, you must generate an engineering report on a floppy diskette and return it with the failed pak. Refer to section 4 module, Generating an Engineering Report, for details.

Besides reporting on the MAF, you are encouraged to report hardware and software suggestions and requests for action made at the site either by the customer or by the maintenance activity results. Refer to subsequent pages in this book to make these additional reports.

The MAF is a one-page carbonless form with six copies under it. The figure on the facing page shows the layout of the MAF. To complete the MAF, all you need to do is

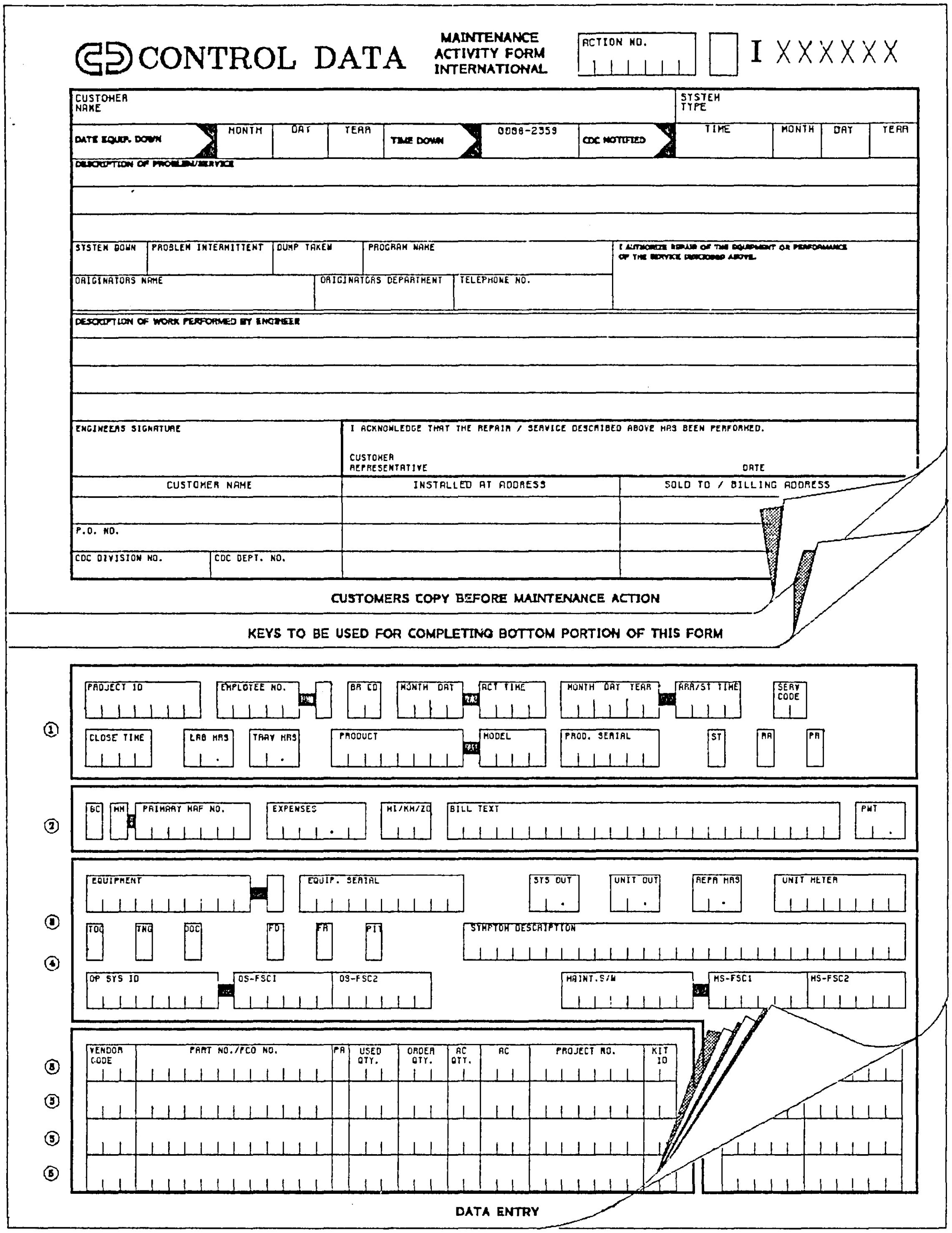
- Fill in the top half of the page;
- Read the page titled, Keys to Be Used for Completing Bottom Portion of This Form;
- Complete the bottom half of the page.

If you are unfamiliar with the MAF, refer to the MAF/IMS Reporting Guide [Control Data publication 41621125] that shows how to complete and process the form.

For unusual situations, apply the following guidelines to the use of the MAF:

- When more than one problem is worked on during a single time period (whether on the same or different equipment), fill out a separate MAF for each activity or piece of equipment. If the system is down during the period, enter the time it is unavailable for each activity;
- If more than one person works on a problem, individually or together, the primary maintenance person fills in a full form, whereas the secondary person fills in only the required portion shown in the MAF/IMS Reporting Guide;
- If a problem is worked on more than once (the problem returns after being fixed or after it seems to have disappeared), fill out a separate MAF for each time session.

Maintenance Activity Form



CONTROL DATA
MAINTENANCE ACTIVITY FORM INTERNATIONAL
ACTION NO.
I XXXXXX

CUSTOMER NAME
SYSTEM TYPE
DATE EQUIP. DOWN | MONTH | DAY | YEAR | TIME DOWN | 0000-2359 | CDC NOTIFIED | TIME | MONTH | DAY | YEAR
DESCRIPTION OF PROBLEM/SERVICE
SYSTEM DOWN | PROBLEM INTERMITTENT | DUMP TAKEN | PROGRAM NAME | I AUTHORIZE REPAIR OF THE EQUIPMENT OR PERFORMANCE OF THE SERVICE DESCRIBED ABOVE.
ORIGINATORS NAME | ORIGINATORS DEPARTMENT | TELEPHONE NO.
DESCRIPTION OF WORK PERFORMED BY ENGINEER
ENGINEERS SIGNATURE | I ACKNOWLEDGE THAT THE REPAIR / SERVICE DESCRIBED ABOVE HAS BEEN PERFORMED.
CUSTOMER REPRESENTATIVE | DATE
CUSTOMER NAME | INSTALLED AT ADDRESS | SOLD TO / BILLING ADDRESS
P.O. NO.
CDC DIVISION NO. | CDC DEPT. NO.

CUSTOMERS COPY BEFORE MAINTENANCE ACTION

KEYS TO BE USED FOR COMPLETING BOTTOM PORTION OF THIS FORM

① PROJECT ID | EMPLOYEE NO. | BR CD | MONTH DAY | ACT TIME | MONTH DAY YEAR | ARR/ST TIME | SERV CODE
CLOSE TIME | LAB HRS | TRAV HRS | PRODUCT | MODEL | PROD. SERIAL | ST | RR | PR

② BC | MM | PRIMARY MAF NO. | EXPENSES | MI/KM/ZO | BILL TEXT | PMT

③ EQUIPMENT | EQUIP. SERIAL | STS OUT | UNIT OUT | REPR HRS | UNIT METER
④ TOC | TNC | DOC | FD | FR | PI | SYMPTOM DESCRIPTION
OP SYS ID | OS-FSC1 | OS-FSC2 | MAINT.S/W | MS-FSC1 | MS-FSC2

⑤ VENDOR CODE | PART NO./FCO NO. | PA | USED QTY. | ORDER QTY. | AC QTY. | AC | PROJECT NO. | KIT ID
⑤
⑤
⑤

DATA ENTRY

C2060

Generating an Engineering Report

When a faulty condition cannot be reproduced, the factory uses the engineering report, which contains all console error logs, to isolate the faulty chips. At the console, generate the appropriate engineering report and dump it to a diskette. Return the floppy diskette with the failing pak.

When to Generate an Engineering Installation Report

If you replace a logic pak to correct a problem during system installation, generate an installation report. If you replace a logic pak during normal corrective maintenance, generate a manufacturing report. Because this is a console operation only, you can perform it while NOS/VE is running. However, you should perform this operation after repair verification but before reestablishing NOS/VE.

How to Generate an Engineering Report

1. Return to the main menu or press <Ctrl Alt Del> then <Esc> to display the main menu.

2. Type in the following sequence to display the Generate Engineering Reports menu:

   M to display the Maintenance menu
   E to display the Engineering Tasks menu
   G to display the Generate Engineering Reports menu shown below.

   GENERATE ENGINEERING REPORTS

   Display Console Activity Log
   Log Comments in Activity Log
   Installation Report
   Manufacturing Report

3. Press **L** to select Log Comments in Activity Log.

4. Enter the serial number of the system and your own comments, if any.

5. Press <F3> to save the contents of the activity log and to exit the log.

6. Press **M** to generate the manufacturing report or **I** to generate the installation report to diskette.

7. Insert a blank diskette in the diskette drive and close the drive latch. If the diskette contains other files, make sure you move them first to another diskette. When you generate the report, you delete all data on the diskette .

8. Press <Return> to dump the report to diskette.

9. When the message **Copy to Floppy Complete -- File Purged from Hard Disk** appears, remove the diskette and place it in its paper envelope.

10. If a label is already on the diskette, use a felt pen to write on it the serial number of the system, for example S/N 115, and also the serial number of the failed pak. If the diskette is new, write the information on a label before sticking it on the top portion of the diskette.

NOTE

The console software records all your operations and the major displayed system messages in a console activity log. You can view this log by entering **D** at the Engineering Report menu.

If the console has an optional console printer, you can also print this log when it is displayed on the console by pressing <Shift PrintScrn>. You may include this log with your MAF report or engineering report.

Requesting Hardware Corrections by TAR

Use the Technical Action Request (TAR) form to report hardware problems. On the TAR form, you report and request the correction of technical problems, suggest enhancements, and make suggestions related to hardware and hardware documentation in the field. When you report by way of the TAR, you ensure the proper response from Engineering Services.

Follow these guidelines to classify a TAR and to show the priority it has according to its impact on the site:

1. Read the completion instructions on the back of the TAR form.

2. Indicate the proper priority by selecting one of these categories:

CRITICAL	Equipment cannot perform its specified function; no alternative method is available. Situation requires immediate action. Critical TARs must have the approval of the Regional Technical Support Manager.
SERIOUS	Equipment either not performing to specifications or to customer's expectations, or maintainability is affected by deficiencies in documentation or design.
MINOR	Inconsistencies or irregularities exist. Applies to all TARs that are not classified critical or serious.
ENHANCEMENT or SUGGESTION	Requests a particular enhancement for or makes a suggestion about hardware products. Critical, serious, or minor priorities do not apply.

3. Fill in all other information and attach supporting documentation or parts to the TAR if applicable.

4. Submit the TAR to the Engineering Services organization. If you have access to the TAR Command Data Base, enter or create the TAR interactively from your terminal.

Technical Action Request (TAR) Form

TECHNICAL ACTION REQUEST

Completion Instructions on Back

Database Tracking	
Originating Division	TAR No. XXXXXX

Date ________ MM DD YY

Originator ________ Originator Mail Station ________

Phone ________

Site Name ________ Project No. ________

System Type ________ Product ID ________ ________ PRODUCT MODEL

Equipment I.D. ________ ________ ________ EQUIPMENT TYPE SERIES SERIAL NO.

Operating System Used: Name ________ Version/Level ________

Found During Installation: Yes ☐ No ☐

Subject: ________

FCA Level ________ ☐ Supporting Documentation/Parts Attached

________ Part/Publication Number

Type Classification

- ☐ Hardware
  - ☐ Critical
  - ☐ Serious
  - ☐ Minor
- ☐ Enhancement or Suggestion
- ☐ Other

Detailed Description: Describe the problem in detail. Include part number(s) identifying failing part(s) / equipment(s), CIP, Microcode/FCO levels, the problem and proposed resolution/action/effects, and other pertinent information/remarks.

For additional description space, use form AA1514 - TAR Continuation sheet

Tar Admin. Date Entered ________ Assigned to ________

AA342 Rev 6/88 CDC

TAR ADMINISTRATOR

C2034

Requesting Software Corrections by PSR

Use the Programming System Report (PSR) form for reporting software problems in the field. On this report, you should provide relevant information about software problems, classify the problem by type, and indicate the priority according to the impact of the problem on the site.

Before sending a PSR and if you have access to the PSR data base SOLVER, access the data base to look for solutions or suggestions that are similar to your problem. You can create the PSR interactively from SOLVER.

Use the following guidelines to complete the PSR form. Full instructions for filling out the PSR form are also printed on the back of the form.

1. Fill out one form for each problem report or request for software enhancement.

2. Enter the information in the appropriate location on the form. For example, refer to the PSR form on the facing page. If you have difficulty classifying and indicating the priority of the problem, refer to the back of the PSR form for detailed guidelines.

3. Provide a full description of the problem or of the request for software enhancement as follows:

   a. Describe the problem. Identify the following if possible:

      - The feature that failed;
      - The nature of the failure and the frequency of the problem;
      - Whether or not there is a pattern. Is the occurrence of the problem predictable?

   b. Define the environment in which the problem occurs as follows:

      - Operating system level of the computer;
      - Hardware problems at the time of error, if applicable;
      - Recent changes made to the hardware.

   c. Provide additional problem documentation such as memory dumps and listings.

4. After completing the entire form, remove the originator's copy and send the remainder to the central PSR coordination address on the back of the PSR form.

Programming System Report (PSR) Form

PROGRAMMING SYSTEM REPORT

CONTROL DATA USE ONLY

PSR IDENTIFIER	TRACER NUMBER
	XXXXXX

REPORT TYPE

- ☐ PROBLEM
- ☐ REQUEST FOR SOFTWARE ENHANCEMENT

SUBMITTER REFERENCE NO.

SUBMITTERS PRIORITY

☐ CRITICAL ☐ URGENT ☐ SERIOUS ☐ MINOR

HARDWARE PRODUCT/MODEL	OPERATING SYSTEM USED NAME-VERSION-LEVEL	SOFTWARE PRODUCT BEING REPORTED ON NAME-VERSION-LEVEL

ABBREVIATED DESCRIPTION (70 Characters Max. Please)

FULL DESCRIPTION

☐ Full description continued on following ______ page(s)

SITE CODE	DATE SUBMITTED	SUPPORT MATERIALS	DATE RECEIVED
		☐ TEST CASE ☐ MEMORY DUMP ☐ LISTING OUTPUT ☐ DATA TYPE ☐ OTHER ☐ SUGGESTED FIX	

FROM

SITE NAME	ORIGINATOR'S NAME
SITE ADDRESS	ORIGINATOR'S PHONE
	CONTROL DATA CONTACT
	CONTROL DATA OFFICE

AA6718 REV. 11/79

C2035

Handling Failed Parts and Materials

Return all failed assemblies or logic boards removed from the computer system to your local service center where they are tested, repaired, or returned to the manufacturing plant or world distribution center. Because failed parts must be protected from further damage in transit, take all necessary handling and packaging precautions.

Guidelines for Handling Defective Parts

- Take the ESD control precaution when handling logic paks and electrical assemblies.
- Use ESD protective bags to protect individual paks.
- Keep the replacement part's container and ESD protective material and reuse it to pack the part for return.
- Fill in all the information requested on the RETURN PARTS TAG. See the figure on the facing page.
- If the tag cannot be tied to the assembly, affix the tag to the package.
- Place the return package in the maintenance case for protection during transit.
- Do not leave the maintenance case in your car on very cold or very hot days. Electrical components may be damaged if subject to extreme temperatures outside their acceptable temperature range of 10°C through 52°C (50°F through 126°F).

If you need to return parts by carrier from the service center to another facility or to manufacturing, follow your local service center's instructions about where to send the failed parts and what document to fill out for shipping.

Refer to Engineering Services Administrative Manual, procedure 3.270, for guidelines for packaging parts for shipment.

Return Parts Tag

NOTE TO REPAIRER

RETURN THIS TAG AFTER PART IS REPAIRED
ENGINEERING SERVICES
RETURN PARTS TAG

CONDITION OF RETURN:

- ☐ DEFECTIVE
- ☐ DEFECTIVE, DOA
- ☐ DEFECTIVE, IM
- ☐ GOOD PART RETURN TO STOCK
- ☐ INTERMITTENT

DATE ________ PROJ. # |_|_|_|_|_|_|_|

PART NO. |_|_|_|_|_|_|_|_|_|_|_|_|

PRODUCT & S/N ____________

EMPLOYEE NO. ____________

IMS/MAF NO. ____________

PROBLEM DESC. / COMMENTS

____

____

____

- NOT TO BE AFFIXED DIRECTLY TO ELECTRICAL SURFACES.
- AFFIX TO PACKAGE IF TAG CANNOT BE TIED TO EQUIPMENT.

PARTS ADMINISTRATION

T PROJECT / ID |_|_|_|_|_|_|_|_|_|_|

PART NUMBER USED (IF DIFFERENT THAN PART NUMBER RETURNED)

PART NO. |_|_|_|_|_|_|_|_|_|_|

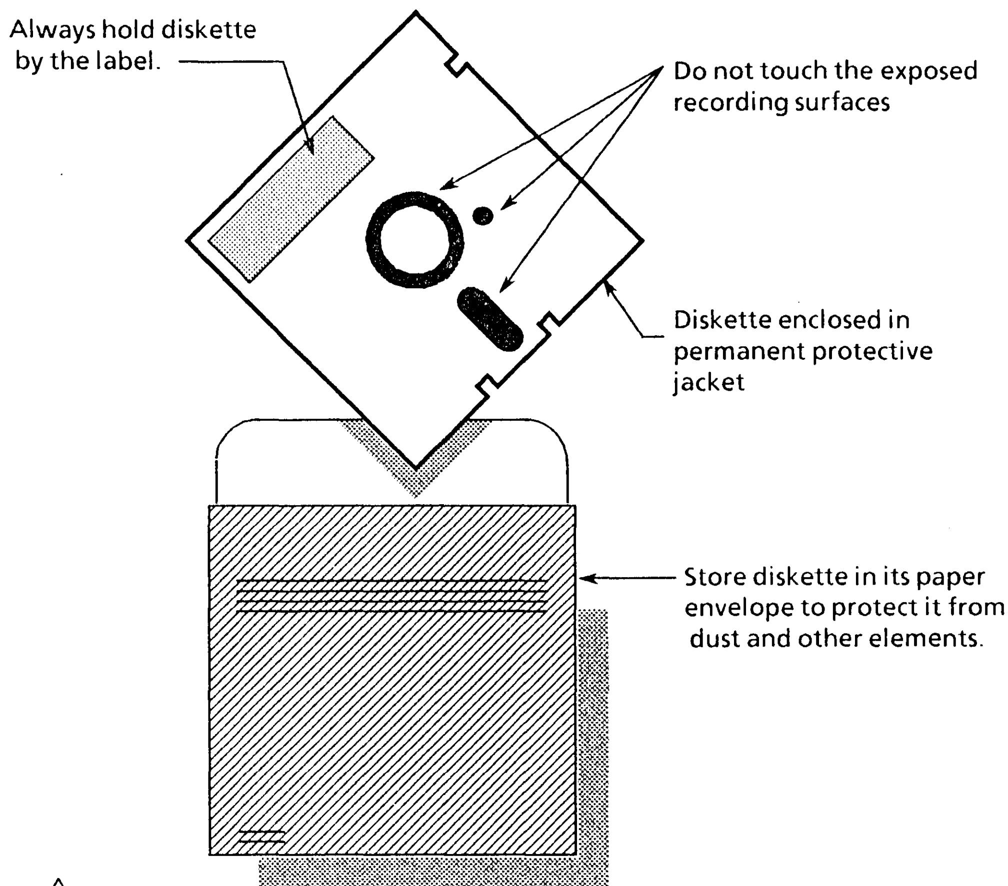
ACTION CODE |_|_|

SITE COPY

AA6817 REV 10/85 CDC *C2053*

When returning a diskette or tape to the service center for further processing or analysis, take the following handling precautions.

Diskettes and Magnetic Tapes



⚠

- Never leave a diskette in the disk drive when the power is being turned off.
- Keep diskettes and tapes away from equipment and electrical appliances that have a magnetic field.
- Never put anything on top of a diskette or tape.
- Do not leave diskette or tape in your car on cold or hot days.
- Do not allow diskettes to go through x-ray scanners that are used in airport security systems. Scanners may alter the magnetic impression on the diskettes.
- Do not write on a diskette with a pen or pencil. Use a soft felt pen instead.
- Do not smoke near a diskette.
- Do not use rubber bands or paper clips on the diskette.

C2004

Replenishing Parts

To avoid any delay in the service call or dissatisfaction to the customer, make sure you have an adequate supply of spare parts.

The 930 and 932 computers are built using different versions of the assemblies to reduce manufacturing cost. To avoid ordering incompatible part, always use the part number shown on the label on the faulty unit to order the replacement part.

Always order new replacement parts right after the service call. The next three modules list all the field replaceable units for the mainframe, CC595 console, and the peripheral cabinets. Because field change orders affect part numbers, the parts listings are for reference only.

Field Replaceable Units in the Streaming Tape Unit

If you need the part number of a field replaceable unit within the streaming tape unit, refer to the Streaming Tape Unit Hardware Maintenance Manual [Control Data publication 49763100]

Field Replaceable Units in the Expanded Module Drive

If you need the part number of a field replaceable unit within the expanded module drive, refer to the Expanded Module Drive Hardware Maintenance Manual Volume 1 [Control Data publication 83325820]. For part number of the power replaceable units in the expanded module drive cabinet, refer to CM-3 Disk Subsystem Hardware Maintenance Manual [Control Data publication 3325670].

Field Replaceable Units in the IPI Tape Controller and Drive

If you need the part number of a field replaceable unit in the IPI tape controller and the tape drive, refer to the 5698 CYBER Magnetic Tape Subsystem User's Guide [Control Data publication 60000397].

Parts Listing of Mainframe Maintenance Kits and FRUs

Parts listings for field replaceable units in the mainframe are listed below. Because field change orders affect part numbers, the parts included here are for reference only.

Before taking your maintenance kit to the customer's site, check its contents against the list below to ensure that you have everything.

The maintenance kit is a case that contains a set of field replaceable units grouped according to functional area or system element. The CYBER 930 Computer System can have the optional central system of either AA177A, AA177B, or AA180A. The AA180A central system is also refered as the 932 mainframe. The following four kits support all central systems.

930/932 Mainframe Maintenance Kits

Kit 1 of 4 - CPU

Part Number	Quantity	Description
10124208	1	FCO log form
19270474	4	New or blank floppy diskettes
19270475	2	Diskette binder pockets
19270555	1	7KL0 pak assembly (CPU C)
19270663	1	930 CPU A-B module assembly (7KJ0 and 7KK0)
19270915	1	932 CPU A-B module assembly (7DJ0 and 7DK0)

Kit 2 of 4 - CMEM/PP

Part Number	Quantity	Description
19270474	4	New or blank floppy diskettes
19270475	2	Diskette binder pocket
19270550	1	7KD0 pak assembly (CMEM)
19270712	1	7DM0 pak assembly (932 page map)
19270717	1	7KC0 pak assembly(CMEM - 64MB)
19270885	1	7KM0 pak assembly (930 page map)
19270932	1	7KF0 pak assembly (5 PPs)

Kit 3 of 4 - IOU/Clock

Part Number	Quantity	Description
19270474	4	New or blank floppy diskettes
19270475	2	Diskette binder pocket
19270551	1	7KE0 pak assembly (930 IPI and ICI channels)
19270706	1	7DA0 pak assembly (932 clock)
19270923	1	7KA0 pak assembly (930 clock)
19270942	1	7DE0 pak assembly (932 IPI and ICI channels)
19271138	1	4KB0 pak assembly (930/932 MAC and TPM)

Kit 4 of 4 - Miscellaneous

Part Number	Quantity	Description
15185502	5	Fuse, mini 30 V, 0.75 A (on ICA pak)
19270463	1	7AY0 pak assembly (ICI/IPI converters)
19270474	4	New or blank floppy diskettes
19270475	2	Diskette binder pocket
19270716	1	7DT0 board (932 terminator)
19270855	1	4KT0 board (930 terminator)
19271096	1	7AZ0 pak assembly (ICI/C170 converters)
22112889	1	PCB assembly - ISMT adapter
22143210	1	Module assemby, ICA2
53590847	1	Module assemby, ICA1
93419330	5	Fuse: time lag, 3 A

Mainframe Power FRUs

Part Number	Description
15153854	Sensor module assembly
19269259	Power cable kit
19269260	Cooling fan assembly (for cabinet with a junction box)
19269512	Mainframe control panel (emergency off)
19270411	Fan junction box assembly
19270745	AC distribution rack
19270822	Monitor and control module
19271066	Cooling fan assembly (for cabinet with a fan speed control board)
19270922	Ceag power supply
93419322	Fuse: time lag, 1 A
93419330	Fuse: time lag, 3 A
19270652	50-Hz battery charger box
19270653	60-Hz battery charger box
19270954	AC junction box
23106966	Battery pack
24513001	Fuse: 15 A 60-Hz battery charger box
24513004	Fuse: 2 A 50/60-Hz battery charger box

Mainframe Miscellaneous Assemblies and Cables

Table 1 of 2

Part Number	Description
15185502	Fuse, mini 30 V, 0.75 A fast (on ICA pak)
19268196	Lithium battery (on the MAC/TPM pak)
19269392	Door assembly - front
19269430	Side panel - left
19269435	Side panel - right
19269440	Cabinet top cover
19269543	Fixed caster
19269544	Swivel caster
19269874	CYBER 930 product identification label
19269920	Rear door assembly
19269954	ISMT adapter-cable drop set
19270133	MCM-to-AC distribution rack cable assembly
19270135	Power supply-to-MCM cable assembly
19270136	MCM-to-card cage cable assembly
19270137	MCM-to-cooling fan cable assembly (for fan assembly 19269260)
19270227	Color labels and cable identification stickers
19270228	Cable identification stickers
19270472	AC distribution rack-to-power supply cable assembly
19270619	MCM-to-power supply cable assembly
19270620	Power control cable - 10 ft
19270621	Power control cable - 85 ft
19270622	Power control cable - 5 ft
19270629	Junction box cable assembly (for fan assembly 19269260)
19271531	Air filter assembly

Mainframe Miscellaneous Assemblies and Cables

Table 2 of 2

Part Number	Description
19270787	RS232-MCM wired cable assembly. It replaces cable assembly 19269751.
19270810	Leveler
19270982	Fan speed control cable assembly
19270989	Fan speed control board (for fan assembly 19271066)
19271065	MCM-to-cooling fan cable assembly (for fan assembly 19271066)
19271069	ICA cable assembly. It replaces cable assembly 19270416 or 22127796
22107775	Contact strip - RF shield. (Cut strip to desired length)
22110398	CYBER 170 channel converter cable assembly
22110399	RS232 drop cable
22127793	ICI channel cable assembly
22127795	IPI cable assembly
22127796	ICA cable assembly
22179414	Card cage assembly
24620036	Transceiver cable assembly - 10 ft (TN110-A)
24620038	Transceiver cable assembly - 50 ft (TN110-B)
24620039	Transceiver cable assembly - 100 ft (TN110-C)
53984771	Ethernet transceiver box (TN111-A)
75448048	MultiTech 224EH modem

Parts Listing of Console FRUs

The following table lists the part numbers of all field replaceable units (FRU) and cables in the console.

Console FRUs

Part Number	Description
15409116	256 K memory chip
15409819	Serial port (HE18169760)
19269633	RTA modem cable
19269794	Console-to-mainframe cable
19270169	930 monitor logo
19270760	930 keypad template
HE13412460	Drive cable 34C
HE13415630	CPU-I/O cable assembly
HE13415920	Speaker assembly
HE13417730	20-pin HD cable assembly
HE13417740	34-pin HD cable assembly
HE15023600	Floppy drive. To ensure the replacement floppy drive can be installed in its slot, order part number shown on the label on the faulty floppy drive.
HE15026900	Hard disk controller
HE15028900	20-megabyte hard disk drive
HE16316000	Keyboard (with cable)
HE18156081	I/O board
HE18157510	CPU board with 256 K memory
HE18169580	ROM expansion board
HE23479600	Power supply
HE89650000	Line cord
HEZVM13308	60-Hz monitor (order also the monitor logo 19270169)
HEZVM13308E	50-Hz monitor (order also the monitor logo 19270169)

Parts Listing of Peripheral FRUs

The following tables list the part numbers of all the field replaceable units (FRUs) and cables in the tape cabinet, disk cabinet, tape/disk cabinet, and fixed storage drive.

Tape Subsystem - Cabinet FRUs and Cables

Part Number	Description
15386861	External I/O cable assembly
19269466	Tape control panel
19269747	ISMT drop cable assembly (male)
19269748	ISMT drop cable assembly (female)
19269774	Tape cooling fan assembly
19270788	50- or 60-Hz tape unit internal cable assembly
75168329	60-Hz 10-ft tape power cord
75168330	50-Hz 10-ft tape power cord
77015830	50- or 60-Hz tape drive AC connection

Disk Subsystem - Cabinet FRUs and Cables

Part Number	Description
15389275	CM power supply
15389023	CM fan assembly - crossflow
19270412	CM3 DC cable assembly
47009790	CM I/O panel assembly - pak ABMC
47058818	CM main logic board - pak EAUC, FAUC, or GAUC
54096525	CM error display - pak AAVC
72852574	CM air filter
15386904	I/O cable assembly - 5 ft (IPI cable)
15386906	I/O cable assembly - 10 ft (IPI cable)
19269761	Disk power cable kit
19269766	Disk display panel
19269830	Air filter
19269952	I/O cable assembly - 75 ft (IPI cable)
19269956	I/O cable assembly - 15 ft (IPI cable)

Tape/Disk and Disk Cabinets - Power FRUs

Part Number	Description
19269782	Tape/disk power cable kit
19270478	Power bar box assembly
19270745	AC distribution rack
93419322	Fuse: time lag 1 A
93419330	Fuse: time lag 3 A
19269380	60-Hz battery charger box
19270052	50-Hz battery charger box
23106966	Battery pack
24513001	Fuse: 15 A. 60-Hz battery charger box
24513004	Fuse: 2 A. 50/60-Hz battery charger box

Miscellaneous Assemblies and Cables

Part Number	Description
19269805	Gas spring - tape (for tape top cover 19269770 only)
19269871	9836 Disk Subsystem product identification label
19269872	9639 Tape Subsystem product identification label
19269873	9730 Tape/Disk Subsystem product identification label
19270429	Cable trough
19270468	Charger-to-power bar cable assembly
19270471	AC distribution rack-to-power bar cable assembly
19270620	Power control cable, 10 ft
19270621	Power control cable, 85 ft
19270622	Power control cable, 25 ft
19271374	Spring assembly-tape lid (for top cover 192701574)
19271574	Tape top cover assembly.
75168337	Power cord, 2 poles, 3 wires, 5 ft

Field Replaceable Units in the Fixed Storage Drive

Part Number	Description
15181751	Logic plug *0*
15181752	Logic plug *1*
15181753	Logic plug *2*
15181754	Logic plug *3*
15458851	I/O terminator
47002002	Fault status cable (P13/P17/P17)
47029372	I/O cable, internal
47038318	Brake adjust shim
54330907	HPBX operator panel
54366902	CSVX mother board
54367304	ESWX motor speed and power amplifier board
54384505	FUQX fault display board
54389338	APVCX control board
54391300	AVHX read/write board
54402005	DWLX I/O board
72852571	Filter, primary
72854200	Ground spring assembly
72856101	Brake connector assembly
73089132	Module assembly, PA5R2-F (formatted)
80547301	DC power cable (P15/35)
81235102	Fan assembly
81542303	Power supply, integral
93012800	Solenoid and connector assembly
94231901	Motor and cable assembly

SECTION 5

MAINTENANCE AIDS AND UTILITIES

Setting Up and Using the Console for Remote Technical Assistance (RTA)

Before a remote data link operation, set up both consoles according to the procedures below. You must set up the parameters and the callout and callin telephone lists in the system console and the remote console. Then verify that the operating modem parameters are set up correctly (see the next module) before referring to subsequent modules to establish the link either from the system console or from the remote console.

Setting Up the Remote Console

The remote console must be compatible with the system console and contains the remote technical assistance software in the console hard disk. To install the remote technical assistance software package on floppy diskettes to the hard disk of the console, refer to the CYBER 930 Remote Console Installation Guide [Control Data publication 60469555].

Setting Up the System Console

If the callout and the callin telephone lists do not include the telephone number of the site you want to call, ask the operator to set them up or you can set them up according to the procedures in the CYBER 930 Computer System Guide to Operations [Control Data publication 60469560]. You must contact Technical Support at the remote console to set up the callout and the callin telephone lists.

Editing the Telephone Lists

To edit the callout and the callin telephone lists yourself, refer to the following procedure.

1. Type **R** from the Console Main menu to display the Remote Operations menu.

```
REMOTE OPERATIONS

Answer Incoming Calls
Call Remote Console
Direct Cable Connection
Manual Telephone Connection
```

2. Type **A** to select Answer Incoming Calls menu.

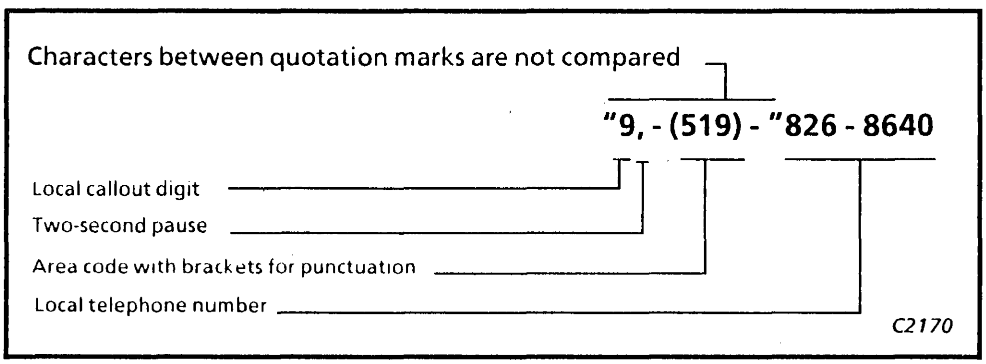
3. Type **E** to select the Edit Telephone List menu.

4. If the console prompts you for the password, enter the password to proceed and display the Callin Telephone List.

5. Type 1. This allows you to enter or edit the first number in the callin list.

   Type in the telephone number. The callin telephone list contains the remote site telephone numbers that are authorized to call in and operate the system. The callout number is also the remote site telephone numbers. When you enter the number, do the following:

   - Use only numerals and the punctuation marks: " " , ( ) - and space. Other characters give unpredictable results.
   - The console translates the comma into a request to the modem for a two-second pause in the dialing sequence.
   - Numbers enclosed in quotation marks "XXX" are not compared during the callback security check by the system console. The quotation marks allow you to include the local callout digits and area codes to effect a return call. See the example below.
   - Each telephone number can be prefixed by the word *disable.* If the **Ignore "disable" options when answering calls** option under the console security options is set to NO, *disable* prevents the local console from returning an incoming call when a match of telephone numbers occurs. The remote console must also use *disable* to prefix its own telephone number for the disable feature to work.



6. Press <Esc> to return to the Answer Incoming Calls menu.

7. To edit the callback telephone list:

   - Press <Esc> to return to the Remote Operations menu;
   - Type C to display the Call Remote Console menu;
   - Repeat steps 4 through 6.

Setting Modem Parameters and Switches for Calls

Set up the parameters according to the modem requirement at the local and remote sites for a proper link for remote operations. The default parameters shown below are preset by the console software. You can change the default setting that applies to the modem you are using. You may also be required to set the dual inline packaging (DIP) switches in some modems, such as the MultiTech 224EH used in North America, for the proper operation of the modem.

Changing Communications Parameters

When you install the console software, it is already preset with default communications parameters. To view the Communications Parameters menu from the system console, type in the following sequence from the Console Main menu:

R	To select the Remote Operations menu;
A or **C**	To select the Answer Incoming Calls menu or the Call Remote Console menu;
C	To display the Communications Parameters.

If you are at a remote console, type **A** and then **C** to display the Communications Parameters when the Remote Link Options menu appears. The default parameters setting shown in the figure opposite has the following definition:

Modem Initialization String (a program for the modem)

AT	Attention (start of command).
E0	Do not echo command mode characters.
Q1	Do not return result codes.
B1	Wait for a dial tone.
S0=1	Answer at the first telephone ring.
S2=127 & E1 & Q1	Set escape code character, autoreliable mode, and responses.

Modem Dial String

AT	Attention.
D	Dial.
P	Pulse (rotary dial) telephone.
T	Tone. For touch tone telephone, enter ATDT for the modem dial string.

Baudrate = 2400	The speed of the modem. The value must be the same at both consoles.
Parity = none	The parity can be odd, even, or none. The recommended setting is none.

Default Modem Setting

COMMUNICATIONS PARAMETERS
Modem Initialization String = ATE0Q1B1S0=1S2=127 & E1 & Q1
Modem Dial String = ATDP
Baudrate = 2400
Parity = none

To change the parameters:

1. Select the item you want to change and press <Return>.

2. Select or type in the new parameter and press <Return> to save the change.

3. If you do not want to change the content of the parameters, press <Esc>.

4. Set the baud rate and parity the same in both consoles.

Setting the DIP Switch in the MultiTech 224EH Modem

If the modem for the remote link operation is the MultiTech 224EH, set the DIP switches on the underside of the modem to the following:

Switch	Setting
3 and 8	Down
1, 2, 4 through 7	Up

You must set switch 1, which is used for setting the data terminal ready signal, to Up for proper remote link termination. For modems other than the MultiTech 224EH, set the Data Terminal Ready signal to normal.

Establishing a Remote Link for Technical Assistance

Each time you escalate a problem during maintenance troubleshooting and request technical assistance, it comes either as onsite support or as remote technical support.

You can establish a connection for remote technical assistance from a local console by following any one of these procedures:

- Calling the remote console,
- Accepting a call from the remote console,
- Connecting the telephone manually,
- Cabling to the system console directly.

If you want to establish a remote link from the remote console to the local console, refer to the next module.

RTA with No Remote Data Link

For a customer who does not have a modem for a remote data link, use the telephone line as the medium for voice communication.

Calling the Remote Console

1. Switch on the modem.

2. Contact the Technical Support at the remote console to get the console ready for answering a call from the system console.

3. Select Remote Operations from the console main menu . From the Remote Operations menu, press **C** and then **S** to display the callout telephone list.

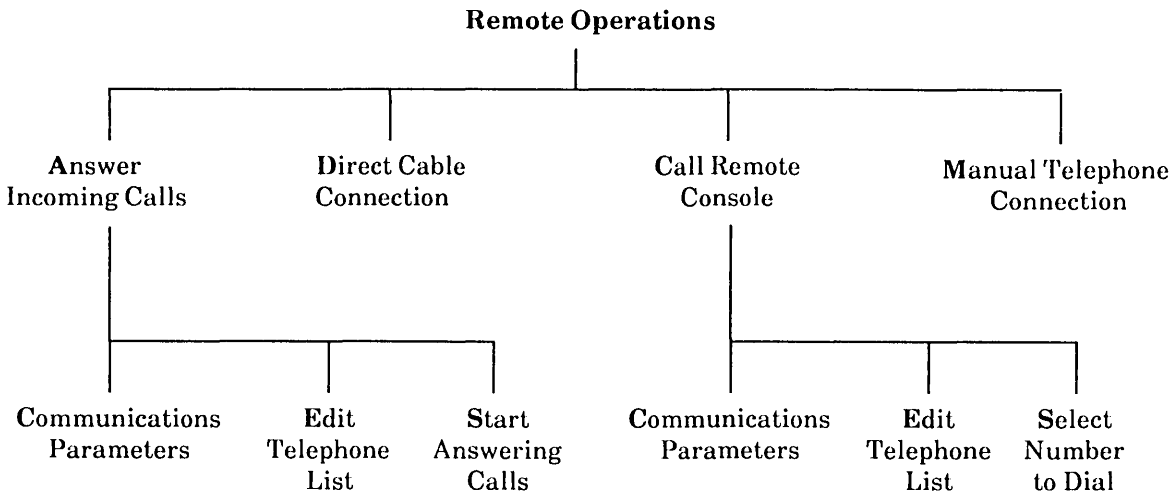
4. Select the telephone number of the remote console site you wish to call. Press <Return> to start the operation. The console displays the status of the operation with messages such as: DIALLING, CARRIER ESTABLISHED, and SYNCHRONIZED. If the link is established successfully, a Remote Operations menu with the options of Terminate Remote Connection and Download File to Remote Console appears.

5. After a remote link is established, control passes to the remote console. However, any time after the link is established, you can press <Esc> to regain control of the keyboard. To return control to the remote console, press <Alt F4>.

6. If you need to communicate with the remote operator through the consoles instead of the telephone, press <Alt F3> to enable the interconsole communications facility (ICCF). ICCF opens a window in both consoles so that you and the remote operator can send messages to each other.

7. If either you or the remote operator presses <Esc> to exit ICCF, both windows close, the original screen reappears, and the activity that was previously running resumes.

8. Press <Alt F5> to terminate a Remote Technical Assistance (RTA) session, or you can select Terminate Remote Connection from the Remote Operations menu when you first establish the data link.



Accepting a Call from a Remote Console

1. Press **A** and then **S** to select Start Answering Calls from the Remote Operations menu.

2. If the remote console calls (the telephone on top of the modem rings), do not pick up the telephone. The console establishes the connection. The console proceeds with the security check by accepting the call or by disconnecting the link, and then dialing the remote console's telephone number to reconnect the link.

3. If the remote link occurs with mainframe power on and passwords enabled, the console prompts for the Remote Access Password.

4. If the remote link is established successfully, a Remote Operations menu with the options of Terminate Remote Connection and Download File to Remote Console appears.

5. After a remote link is established, control passes to the remote console. Keyboard controls for the remote link are the same as stated in steps 5 through 8 for Calling the Remote Console.

Connecting Telephone Manually

To connect manually with a remote console, the local console security options of **Allow Manual Telephone Connection** must be set to **YES**. The remote console may select Answer Incoming Calls or Manual Telephone Connection. If the remote console selects Manual Telephone Connection, the local console can receive the call from the remote console.

When you select Manual Telephone Connection from the Remote Operations menu shown in the menu tree opposite, three options are available:

UART Functions enable you to read and write the remote port UART registers. This option allows complete control over UART. If you are an inexperienced user, use this option to check the baudrate and parity and to raise and drop the Data Terminal Ready (DTR) signal only.

Terminal Mode provides a line mode terminal interface with the modem. When you select Manual Telephone Connection , the console shows your entries and the modem responses.

For more information about terminal mode and its commands, use the space bar to highlight Terminal Mode and press <Alt F1> to view the HELP displays.

Synchronize with Remote Console synchronizes the console with the remote console. To begin a true remote session, you need to exit terminate mode and select Synchronize with Remote Console. After the carrier is established you can type messages to the remote console and receive messages.

To establish a manual telephone connection, follow these steps:

1. Press **M** to select Manual Telephone Connection.
2. If you want to check the baudrate and parity, press **U** to select UART Functions. The baudrate should be 2400 bits per second and parity should be NONE.
3. Press <Esc> to exit UART Functions and press T to select Terminal Mode.
4. Enter ATDP and the telephone number you want to dial for pulse tone dialing or enter ATDT and the telephone number for touch tone dialing.
5. Press <Return> to proceed. Wait for the message **CARRIER** or **CONNECT** to appear.
6. Press <Alt F2> to exit terminal mode.
7. Type **S** to select Synchronize with Remote Console.

Remote Operations

- Answer Incoming Calls
- Direct Cable Connection
  - Baudrate
  - Parity
  - Start Direct Connection
- Call Remote Console
- Manual Telephone Connection
  - UART Functions
  - Terminal Mode
  - Synchronize with Remote Console

If the local console is receiving a call, type **S** when the carrier is detected (the CD indicator on the modem is on). The remote console has to make a manual call for this to work because the automated version of remote console callin requires a callback for security.

8. When the message SYNCHRONIZED appears, it indicates that both consoles are synchronized. After the remote link is established, control passes to the remote console. Keyboard controls for the remote link are the same as shown in steps 5 through 8 for Calling the Remote Console.

   The remote console prompts the user to enter the remote access password to proceed.

Cabling to System Console Directly

If the local console is within 15 m (50 ft) of the remote console and is connected to the remote console by a direct cable without the modems, you can establish the remote link as follows:

1. Set up the baudrate and parity in the system console the same as the remote console. Because the remote link does not go through a modem, set the baudrate to 19,200 bits per second.

2. Select Direct Cable Connection from the Remote Operations menu at both consoles.

3. Press **S** to select Start Direct Connection. The remote console must select Start Direct Connection within one minute after the system console does.

4. When the message SYNCHRONIZED appears, it indicates both consoles are synchronized. After the remote link is established, control passes to the remote console. Keyboard controls for the remote link are the same as shown in steps 5 through 8 for Calling the Remote Console.

Using the Remote Console for Remote Technical Assistance

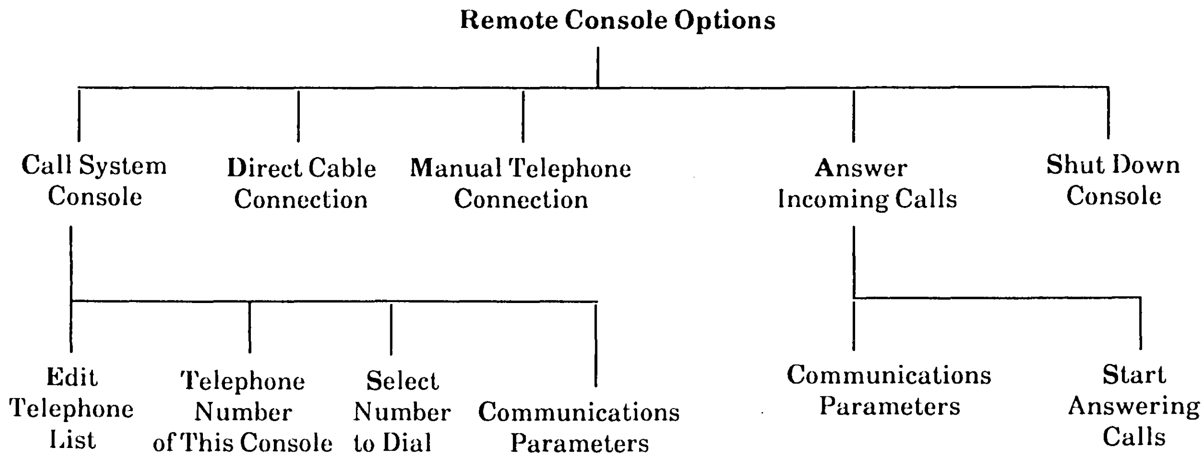
To run diagnostics or assist other onsite customer engineers from a remote console, use the procedures below. Establish the link either by calling the system console, by setting up acceptance of a call from the system console, by manual telephone connection, or by direct cable connection.

Prerequisites for RTA

- The remote console software must be at the same software level as local console software.
- You know the remote access passwords of the computer site. The console will prompt you for the passwords so that it can proceed.
- Communications parameters for the baudrate, parity, and word length must have the same settings in your console and the system console.
- The callin and callout telephone lists are set up correctly at both consoles.
- Both your console modem and the system console modem are powered on and ready.

Calling the System Console

1. Switch on the remote console and the modem if they are not already on.
2. Phone the operator or customer engineer at the system console to tell them to get the console ready for answering a call from the remote console.
3. Press **C** and then **S** to display the callout telephone list from the Remote Console.
4. Select the telephone number of the system console site you wish to call. Press <Return> to start the operation. The modem processes the operation as follows:
   a. The modem dials the system console telephone number and a connection is made.
   b. After a short delay the system console may disconnect and make a routine security check. Meanwhile, your telephone line is disconnected. If the system console dials your console modem number and your telephone rings, do **not** pick up the telephone.
   c. If the remote link occurs with mainframe power on and passwords enabled, the console prompts for the Remote Access Password.
   d. When the link is established successfully, a Remote Operations menu with the options of Terminate Remote Connection and Download File to Remote Console appears.



5. After the remote link is established, control passes to your console. However, any time after the link is established, the operator or customer engineer can press <Esc> to restore control to the system console keyboard.

6. To communicate with the operator or the customer engineer through the consoles instead of the telephone, press <Alt F3> to enable the interconsole communications facility (ICCF). ICCF opens a window in both consoles so that you and the remote operator can send messages to each other.

7. If either you or the remote operator presses <Esc> to exit ICCF, both windows close, the original screen reappears, and the activity that was previously running resumes.

8. Press <Alt F5> to terminate an RTA session, or select Terminate Remote Connection from the Remote Operations menu when you first establish the data link.

Accepting a Call from a System Console

1. Select Answer Incoming Calls from the Remote Console Options menu.

2. If the system console calls, the telephone on top of the modem rings--do not pick up the telephone. Your console proceeds to establish the connection.

3. If the remote link is established successfully, the console displays a Remote Operations menu with the options of Terminate Remote Connection and Download File to Remote Console .

4. After the remote link is established, control passes to your console. Keyboard controls for the remote link are the same as stated in steps 4 through 7 for Calling the System Console.

Connecting Telephone Manually

To connect manually with a system console, the system console security options of **Allow Manual Telephone Connection** must be set to **YES**. The remote console may select Answer Incoming Calls or Manual Telephone Connection. If the system console selects Manual Telephone Connection, the remote console can call the system console.

When you select Manual Telephone Connection from the Remote Console Options menu as shown in the menu tree opposite, three options are available:

UART Functions enable you to read and write the remote port UART registers. This option allows complete control over UART. If you are an inexperienced user, use this option to check the baudrate and parity and to raise and drop the Data Terminal Ready (DTR) signal only.

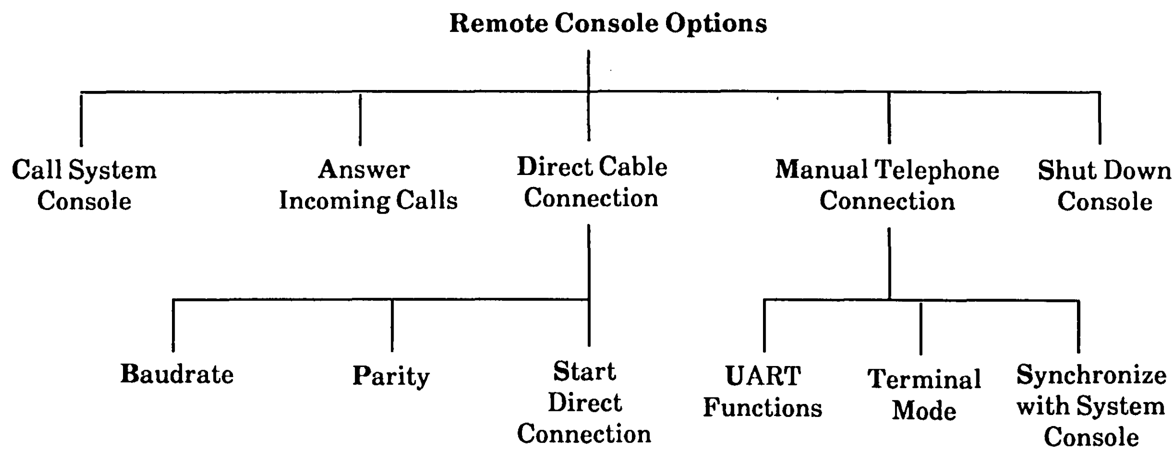
Terminal Mode provides a line mode terminal interface with the modem. When you select Manual Telephone Connection, the console shows your entries and the modem responses.

For more information about terminal mode and its commands, use the space bar to highlight Terminal Mode and press <Alt F1> to view the HELP displays.

Synchronize with System Console synchronizes the console with the system console. To begin a true remote session, you need to exit terminate mode and select Synchronize with System Console. After the carrier is established you can type messages to the remote console and receive messages.

To establish a manual telephone connection, follow these steps:

1. Press **M** to select Manual Telephone Connection.
2. If you want to check the baudrate and parity, press **U** to select UART Functions. The baudrate should be 2400 bits per second and parity should be NONE.
3. Press <Esc> to exit UART Functions and press **T** to select Terminal Mode.
4. Enter ATDP and the telephone number you want to dial for pulse tone dialing or enter ATDT and the telephone number for touch tone dialing.
5. Press <Return> to proceed. Wait for the message **CARRIER** or **CONNECT** to appear.
6. Press <Alt F2> to exit terminal mode.
7. Type **S** to select Synchronize with System Console.



If the local console is receiving a call, type S when the carrier is detected (the CD indicator on the modem is on). The remote console has to make a manual call for this to work because the automated version of remote console callin requires a callback for security.

8. When the message SYNCHRONIZED appears, it indicates that both consoles are synchronized. After the remote link is established, control passes to the remote console. Keyboard controls for the remote link are the same as shown in steps 4 through 7 for Calling the System Console.

   The remote console prompts the user to enter the remote access password to proceed.

Cabling to Remote Console Directly

If the local console is within 15 m (50 ft) of the remote console and is connected to the remote console by a direct cable without the modems, you can establish the remote link as follows:

1. Set up the baudrate and parity in the system console the same as the remote console. Because the remote link does not go through a modem, set the baudrate to 19,200 bits per second.

2. Select Direct Cable Connection from the Remote Operations menu at both consoles.

3. Press S to select Start Direct Connection. The remote console must select Start Direct Connection within one minute after the system console does.

4. When the message SYNCHRONIZED appears, it indicates both consoles are synchronized. After the remote link is established, control passes to the remote console. Keyboard controls for the remote link are the same as shown in steps 4 through 7 for Calling the System Console.

Setting System Options

You can change parameters under the Select System Options menu to change the deadstart process to initiate NOS/VE. However, with an incorrect parameter, NOS/VE may not come up. To avoid such a situation:

- When changing parameters, follow these instructions and make sure that you know the definitions of the parameters.

- After you change the parameters, make sure you change them back to the default values before returning the system to the customer.

How to Access the System Options Menu

If the console displays the main menu, press **M**, **U**, and then **S** to display the first page of the System Options menu. Press <PgDn> if you want to see the second page of the menu. The two-page menus are shown on the following three pages.

How to Change Parameters

- Press <Tab>, <Return>, or the space bar to move to the next parameter.
- Press <PgUp> or <PgDn> to change pages.
- To change *SET MAXIMUM CENTRAL MEMORY ADDRESS* on page 1, enter the new value. To change any other parameter on page 1, press the key that corresponds to the first character of the new value; for example, enter 1 for **16**, or T for **Tape**.
- On page 2, press <Return> to change a parameter value.
- Press <F3> to save the changes and return to a menu screen.
- Press <Esc> to cancel the changes and return to a menu screen.

Page Size and Number of Page Table Entries

Site analysts usually determine the settings of these parameters for the CYBER 930 Computer System. Do not change these parameters for the customer.

NOS/VE Deadstart Command File Number

The NOS/VE Deadstart Command File Number parameter is the reference number of a command file used during the deadstart processes. The original command file is prepared and numbered 1 at the factory. If you change the file number, check with the customer or site analyst. The site analyst may have created other files with different reference numbers.

System Options Menu (Page 1 of 2)

```
                 NOS/VE PARAMETERS                          Page 1 of 2

PAGE SIZE IN KBYTES ..................................... 8
  Valid Entries: 2, 4, 8, 16

NUMBER OF PAGE TABLE ENTRIES IN A CM PAGE ......... 4
  Valid Entries: 2, 4

NOS/VE DEADSTART COMMAND FILE NUMBER (OCTAL) ... 1
  Valid Entries: 0, 1, 2, 3, ... 77

NOS/VE DEADSTART COMMAND FILE LOCATION .......... CIP-DISK
  Valid Entries: TAPE, DISK, CIP-DISK

DEADSTART PAUSE FOR OPERATOR INPUT ................ NO
  Valid Entries: YES, NO

SET MAXIMUM CENTRAL MEMORY ADDRESS (MBYTES) ... 16
  Valid Entries: 8, 10, 12, ... 64
```

NOS/VE Deadstart Command File Location

The CIP-disk on channel 01 is the default location for the deadstart command file. You can reconfigure the system to deadstart from tape or from a different disk. However, before initiating the deadstart process, you may have to change the CIP location for the corresponding channel, equipment, and unit numbers.

Deadstart Pause for Operator Input

With this parameter YES, the deadstart processes pause in system mode so that you can enter system core commands. For more information, refer to the overview of deadstart in the NOS/VE Operations manual [Control Data publication 60463914].

Set Maximum Central Memory Address

The Set Maximum Central Memory Address parameter restricts NOS/VE to less memory than is installed. An analyst might use this parameter to test whether a particular program can run with reduced memory size.

Force Hardware Initialize

This parameter is set to NO. If you fail to power on the system or deadstart to NOS/VE and a status message **Mainframe Connection has Broken** appears, set this parameter to YES and retry the operation.

The message indicates that the service switch powered off the mainframe during maintenance service and that the communication between the console and mainframe had broken. Setting this parameter enables the system to initialize all mainframe elements, clear the central memory, and reestablish communication.

You can also include the parameters, Include Diagnostic Testing and Permit Degrade on Error, during the hardware initialize process.

Include Diagnostics Testing

This parameter is usually set to NO. You may ask the operator to change this parameter and Force Hardware Initialize to YES so that you can collect information about fault symptoms of deadstart failures before your site visit. However, after the maintenance service, but before you return the system to the customer, you must reset this parameter to the default values.

Permit Degrade on Error

Permit Degrade on Error is usually set to NO. If the system time is critical to the customer, you may ask the operator to change this parameter and Force Hardware Initialize to YES. This allows the system to degrade the faulty mainframe elements and operate in a degrade mode before the customer engineer arrives.

Enable MDD Utility

The default for the Load MDD parameter is NO which means do not load the monitor display driver. Change it to YES only when you or Technical Support want to use this utility to display the contents of maintenance registers or central memory.

Before you return the system to the customer, set this parameter back to NO. You must press <F7> to return to system mode to continue the deadstart process.

Load Microcode

The system's microcode (or firmware) normally loads during deadstart; the default setting for this parameter is YES.

System Options Menu (Page 2 of 2)

```
          "INITIATE NOS/VE" OPTIONS                  PAGE 2 of 2

FORCE HARDWARE INITIALIZE ......................  NO
   INCLUDE DIAGNOSTIC TESTING ..................  NO
   PERMIT DEGRADES ON ERROR ....................  NO
ENABLE MDD UTILITY .............................  NO
LOAD MICROCODE .................................  YES
PERFORM CM RELOAD FROM .........................  NO
   DEADSTART DUMP TAPE

          "CONSOLE OPTIONS"

ENABLE AUTOMATIC POWER ON ......................  YES


Valid Entries: YES, NO
```

Perform CM Reload from Deadstart Dump Tape

The defauft setting for this parameter is NO. If you need to reload central memory from a deadstart dump tape, set this parameter to YES, then Initiate NOS/VE. During the process, a display indicates that a central memory reload has been selected and the tape unit channel, and equipment and unit numbers are displayed. The display prompts you to mount the appropriate dump tape and press <Return> to continue.

Enable Automatic Power on

The default setting for this parameter is YES to enable automatic initiation of NOS/VE during the console's power-on sequence. Set this parameter to NO to disable automatic initiation of NOS/VE: you must then select Initiate NOS/VE from the main menu to establish NOS/VE after you turn on the system from the console .

Using a Command Buffer

A command buffer is a file that contains a sequence of operator keystrokes or commands. When you identify the name of the file, the console automatically executes the sequence specified in the file. You can create a command buffer for often-used keystroke sequences to speed up your maintenace activity. The following example shows how you can create and operate a command buffer.

How to Create a Command Buffer

If the console is in console mode, you can create a command buffer as follows:

1. Press <Alt F10> then **Y** to enable maintenance mode.
2. Press <Alt F8> to create a command buffer. The console displays the following command buffer to prompt you for the file name:

```
INPUT : KEYBOARD        OUTPUT : NONE
Output buffer name (file, $PRN) :
```

3. Enter the file name (up to eight characters) . A file-name extension of **cbf** (command buffer file) is assumed by the console and need not be entered.
4. Enter the keystroke sequence you want to save.
5. Press <Alt F8> again to display the following command buffer screen. Notice that the OUTPUT is now the name you enter with a filename extension of **cbf** at the end.

```
INPUT : KEYBOARD        OUTPUT : ????????.cbf, KEYBOARD
Output buffer name (file, $PRN, <CR> to close ????????.cbf) :
```

6. Press <Return> to terminate recording.

How to Execute a Command Buffer

If the console is already in maintenance mode, you can execute the command buffer as follows:

1. Press <Alt F7> to execute a command buffer. The console displays the following to prompt you for the file name:

```
INPUT : KEYBOARD        OUTPUT : NONE
Input buffer name :
```

2. Enter the file name and press <Return>.

Other Helpful Commands

You can also delete the command buffer. The following table summarizes what functions you can perform to maintain the command buffer. You cannot edit the command buffer using the available command list below: you must delete the old file and create a revised version. When you execute the command buffer, make sure that it starts from a predetermined display so that you avoid unpredictable results. See the example on the following page for the provision inside a command buffer that ensures that it starts from a predetermined screen.

Command Buffer Summary

Function	Keyboard Entry
Create a command buffer	<Alt F8>, command buffer name
Terminate recording	<Alt F8> <Return>
Execute a command buffer	<Alt F7>, command buffer name
Terminate execution early	<Alt E>
Restart a command buffer	<Alt F7> <Return>
List all command buffers	<Alt F7> ? or <Alt F8> ?
Delete a command buffer	<Alt F7> – command buffer name or <Alt F8> –command buffer name
Display a command buffer	<Alt F7> @ command buffer name or <Alt F8> @ command buffer name
Exit the utility	<Esc>
Toggle printer echo on and off	<Alt F8> $PRN
Restore local keyboard control	<Alt F7> $NULL.

$PRN is a special console command buffer for turning the printer echo on and off. The first time you enter $PRN, the printer echo is enabled . When you again enter $PRN, the printer echo is disabled.

$NULL is a special console command buffer. If you use the <Alt E> function to terminate a command buffer early and if the state of the command buffer is unknown, you can use the $NULL command buffer to restore keyboard control.

An Example of Command Buffer

An example of command buffer SYSTEST with the keystroke explanations is shown below. When you execute this command buffer, the console ends the display in the subsystem test menu. When you use the command to display the command buffer, the content of the command buffer is displayed in the upper left corner of the screen.

Keystroke Explanation	Command Buffer
Press <Alt F8> then enter SYSTEST. Press <Return> to start recording.	SYSTEST
Press <Esc> eight times. This make the display return to the Console Main menu.	'esc ' 'esc ' 'esc ' 'esc ' 'esc ' 'esc ' 'esc ' 'esc '
Press **M** to select Maintenance menu and press the space bar five times to advance the inverse video bar to the Engineering Tasks option.	m ' ' ' ' ' ' ' ' ' '
Press <Return> to display the Engineering Tasks menu. Type **T** to display Technical Support Functions. Press <Return > to proceed.	'cr ' t 'cr '
Type **D** to display Diagnostics menu. Type **S** to display the Subsystem test menu.	ds
Press <Alt F8> and then <Return> to terminate recording.	END OF FILE

Customizing a Command Buffer

Once a command buffer is created, you cannot edit it from either the console or system mode. However, a command buffer is a standard DOS text file: it can be edited through DOS command or any text editor. If you are an experienced user of DOS, you can exit the console mode and use the DOS command EDLIN or any text editor to edit or create a customized command buffer. When you create a customized command buffer, make note of the following:

- Standard keys are saved as-is in the command buffer. Funtion keys are saved as tokens within single quotes. See the command buffer example on the page opposite.

- If you want to insert a command in the command buffer, start the line with a { character. The command buffer ignores all characters after the { to the end of the line.

- If you want the command buffer to pause for keyboard input, inset a line of **KBRD**. KYBD must be uppercased. This feature is very useful when you must execute a standard set of keyboard sequences and you require a user parameter to continue.

  If you execute a command buffer with a KYBD token, the display stops at the designated screen. Enter the parameter and press <Alt F7> and <Return> to continue with the execution of the command buffer.

- If you insert the tokens **af7** and **af8** into a command buffer, they have the same effect as pressing <Alt F7> and <Alt F8> on the keyboard.

Degrading the System and Reinstating Degraded Elements

The operating system usually monitors faults in the system elements, makes the necessary reconfiguration to degrade the system, and informs the operator of the degrade. However, in some troubleshooting situations, you must manually degrade the system. After the problem that caused the degrade is fixed, you must reinstate the degraded elements.

Experienced operators and Technical Support use NOS/VE commands to degrade or reinstate the system elements. Use the procedure on the following pages to change the states of the system elements through the Configuration Management Utility under the Concurrent Maintenance Library for the Virtual Environment (CML/VE).

If the system elements are peripheral processor, channel, cache, segment map, page map, and central memory, you can change the state of these elements using the console mode. To change the status on an element, refer to the procedure below to access a special global functions menu that can be accessed from any console menu.

Using the Console Global Function

1. Make sure that NOS/VE is terminated.
2. Press <Alt F2> to return to console mode. If the console is already in console mode, proceed to the next step.
3. Press <Alt F10>, then <Y> to enable maintenance mode.
4. Press <Alt F9> to display the Global Functions menu.
5. Select **H** for Hardware Status from the Global Functions menu to display the status of each degradeable element. The figure opposite is an example.
6. Press <PgDn> or <PgUp> to display the next screen. Press the arrow keys to select the PP or channel you want to change.
7. Press <Return> to toggle the hardware status. Press <F3> to save the status and to exit.
8. After maintenance or repair, return to console mode. Before you return the system to the customer, press <Alt F10> then <N> to disable maintenance mode.

Global Functions Menu

GLOBAL FUNCTIONS

Serial I/O Functions
Hardware Status
Maintenance Registers
Engineering DEC Interface
Configure Critical Devices
Dump PP Memory
PP Register Display
Binary Patch Utility
Reconnect with TPM

Hardware Status Menu

*** IOU HARDWARE STATUS *** PAGE 1 of 3

PP # (OCTAL)	STATUS (ON/OFF)	(UP/DOWN)	CH # (OCTAL)	TYPE	STATUS (ON/OFF)	(UP/DOWN)
00	ON	UP	00	ICI	ON	UP
01	ON	UP	01	IPI	ON	UP
02	ON	UP	02	ICI	ON	UP
03	ON	UP	03	IPI	ON	UP
04	ON	UP	04	ICI	ON	UP
			05	IPI	ON	UP
20	ON	UP	20	ICI	ON	UP
21	ON	UP	21	IPI	ON	UP
22	ON	UP	22	ICI	ON	UP
23	ON	UP	23	IPI	ON	UP
24	ON	UP	24	ICI	ON	UP
			25	IPI	ON	UP

Using Concurrent Maintenance Library/Virtual Environment (CML/VE)

1. Log in NOS/VE according to the customer site procedure. Then, as an interactive NOS/VE user, initiate CML/VE by typing **CML** to display theCML/VE main menu.

   If you initiate CML/VE from a system console, type:

SETCL A = $SYSTEM.HARDWARE_MAINTENANCE.DVS.DVS_COMMAND_LIBRARY

   Then press <Return>, type CML, and press <Return>.

2. Select Configuration Utility (Display Hardware/Software Configuration Data) from the main menu to display the System Element Configuration Utility menu.

3. If you need more system element configuration information, select Display Detail System Hardware Element Configuration Information at the prompt. Return to the System Element Configuration Utility menu for the next step.

4. Select Display Information on Specific Hardware Element or Change Element States at the prompt to access the Detailed Element Information Display/Menu.

5. Select the option, Select an Element for Display/Control. At the prompt, enter the name of the element about which you want information. If your entry is a valid element name, the detailed information for that element is displayed. The figure opposite is an example.

6. Set the status of the element accordingly. Note that you can run maintenance software when the element is either ON or DOWN.

```
CML_430 - DETAILED ELEMENT INFORMATION DISPLAY/MENU

STORAGE DEVICE ELEMENT: TAPE_A1
        PRODUCT IDENTIFICATION: $9639_1
        SERIAL NUMBER: 12347
        UNIT NUMBER:    0(10)
        STATE: ON
        CONTROLLER CONNECTIONS:  TAPE_ADAPTER_A

          STATE CHANGE MENU

 1. Select an element for display/control.
 2. Set the element state to ON.
 3. Set the element state to DOWN.
 4. Set the element state to OFF.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP)
CML?
```

Using NOS/VE Command

1. To enter the Logical Configuration Utility (LCU), type **LCU** and Press <Return>.

2. To display the state of an element, type **DISE ????**.

   ???? is the legal logical name of the element.

3. To change the state of an element, use the following command:

   CHANGE_ELEMENT_STATE
   ELEMENT= ????
   STATE= ????

   The name of the element is the legal logical name assigned by the system. The state can be ON, OFF, or DOWN.

   When you change the state of a peripheral to ON, standard microcode reloads, bringing up the peripheral.

4. To exit the LCU, type **QUIT**.

Relocating the System Deadstart Disk

When a system is upgraded with additional disk drives, you may want to change the system deadstart disk to a different disk drive in the expanded system. For example, relocate the system disk from a fixed storage drive to an expanded module drive.

To relocate the system disk:

1. Ask the operator to back up all permanent files on the current deadstart disk and to terminate NOS/VE;
2. Release the CTI/MSL reserved space on the current deadstart disk;
3. Load CIP on the selected new deadstart disk;
4. Ask the operator to restore all permanent files.

Release CTI/MSL Reserve Space on the Current Deadstart Disk

1. Mount the CIP tape on the tape drive and set it to READY and ON LINE.

   NOTE

   Ensure that the CIP tape you use to build the new system disk is at the same level as that previously used to build the current deadstart disk.

2. Press <Alt F2> to return to console mode. Press <Esc> several times until the main menu appears.

3. Enter the following sequence to display the Configure Critical Device menu shown on the opposite page:

   M to select the Maintenance Main menu.
   U to select the Utilities menu.
   C to select the Configure Critical Devices menu.

4. At the line CIP LOCATION, enter the channel, equipment, and unit numbers for the tape drive where the CIP tape is mounted. Enter **TH** to change the device type to ISMT 1600 or IPI 1600.

5. Press <F3> and <Esc> to save the contents and return to the Maintenance menu.

Configure Critical Devices Menu

*** Configure Critical Devices ***

DEVICE	CH	EQ	UN	DEVICE TYPE
CIP LOCATION	0?	00	0?	???? 1600
INSTALL FROM	04	00	00	ISMT 1600
DUMP TO / RELOAD FROM	04	00	00	ISMT 1600

DIAGNOSTIC
DEADSTART PP = 00

Valid Entries:
For CH, EQ, UN and DEADSTART PP - Enter OCTAL Digit
For Device Types -- Enter TL - Tape (ISMT1600/IPI 1600)
TH - Tape (ISMT6250/IPI 6250)
D - Disk

6. Enter the following sequence to initiate a CTI Deadstart from tape:

E	to select the Engineering Tasks.
T	to select the Technical Support Functions.
<Return>	to proceed.
I	to initialize hardware. This step is necessary if the system has just been powered on.
C	to initiate a CTI deadstart from tape and display the CTI Initial Options menu.

CTI Initial Options Menu

```
            INITIAL OPTIONS

    B       BUILD DEADSTART
            DISK
    U       UTILITIES
    H       HELP

    (CR)    BUILD DEADSTART
            DISK
```

7. Enter the following sequence to start the release of CTI/MSL space operation:

B	To display the Build Deadstart Disk menu.
M	To select Manual Operations menu.
C	To replace CTI.
R	To select Release of CTI-MSL/HIVS/OS Reserved Disk Space.

8. When the console prompts you with three separate displays requesting channel, equipment, and unit numbers for the disk drive where the CIP space is to be released, enter the channel number, the physical address of the control module as equipment number, and the unit number of the designated drive.

9. Press <Return> to start the release operation.

10. When the console indicates that the release operation is complete, press <Alt F2> to return to the console Technical Support Functions menu.

11. Proceed with building the new deadstart disk according to the following procedure.

Build CTI/MSL and Reserve Space on the New Deadstart Disk

1. Make sure that the tape is rewound to the beginning of the tape (BOT).
2. At the Technical Support Functions menu, press C to initiate a CTI deadstart from tape and display the CTI Initial Options menu.
3. Press B or <Return> to select Build Deadstart Disk option.
4. Press I to select Initial Operations.
5. When the console prompts you with three separate displays requesting channel, equipment, and unit numbers for the disk drive where you want to install CIP, enter the channel number, the physical address of the control module as equipment number, and the unit number of the designated drive.
6. Press <Return> to start the installation process. Installation time is about ten minutes. When the installation is complete, the console displays the available disk space.

Reconfiguring the System Disk to a Different Channel

If a problem in the system disk channel prevents deadstart to NOS/VE but you want to bring up NOS/VE, reconfigure the system disk from the factory preset configuration of channel 1, equipment 0, and unit 0 to a different channel. The reconfiguration procedure requires you to initiate NOS/VE, to change the NOS/VE deadstart and system device configuration, and to edit the physical configuration file. Follow the procedure closely in the next four pages to ensure the proper reconfiguration.

1. Power the system off from the system console.

2. Set the service switch on the AC distribution rack from SYSTEM to OFF.

3. Remove the intelligent peripheral interface cable from the channel 1 connector of the bulkhead and install the intelligent peripheral interface cable to either channel 3, 5, 21, 23, or 25. The procedure below assumes that you install the cable to channel 3.

4. Reset the service switch to SYSTEM.

5. Power the sytem on from the system console.

6. Enter the following sequence to display the System Options menu shown on the opposite page:

<Esc>	to return to the Console Main menu.
M	to select the Maintenance Main menu.
U	to select the Utilities menu.
S	to select the System Options menu.

7. Press <Return> or <Tab> three times and type **D** to change the NOS/VE deadstart command file location from CIP-DISK to DISK.

8. Press <F3> to save the contents and return to the System Options menu.

9. Press **C** to select the Configure Critical Device menu as shown in the bottom figure on the next page.

10. Type **03** to change the CIP location of the channel from 01 to 03.

11. Press <F3> and <Esc> to save the contents and return to the Console Main menu.

System Options Menu (Page 1 of 2)

```
                 NOS/VE PARAMETERS                              Page 1 of 2

PAGE SIZE IN KBYTES .....................................  8
  Valid Entries: 2, 4, 8, 16

NUMBER OF PAGE TABLE ENTRIES IN A CM PAGE .........  4
  Valid Entries: 2, 4

NOS/VE DEADSTART COMMAND FILE NUMBER (OCTAL) ...  1
  Valid Entries: 0, 1, 2, 3, ... 77

NOS/VE DEADSTART COMMAND FILE LOCATION .......  DISK
  Valid Entries: TAPE, DISK, CIP-DISK

DEADSTART PAUSE FOR OPERATOR INPUT ................  NO
  Valid Entries: YES, NO

SET MAXIMUM CENTRAL MEMORY ADDRESS (MBYTES) ...  16
  Valid Entries: 8, 10, 12, ... 64
```

Configure Critical Device Menu

```
              *** Configure Critical Devices ***

                                                   DEVICE
   DEVICE                      CH | EQ  | UN  | TYPE
                                  |     |     |
   CIP LOCATION                01 | 00  | 0?  | DISK
                                  |     |     |
   INSTALL FROM                04 | 00  | 00  | ISMT 1600
                                  |     |     |
   DUMP TO / RELOAD FROM       04 | 00  | 00  | ISMT 1600

      DIAGNOSTIC
      DEADSTART PP = 00

 Valid Entries:
  For CH, EQ, UN and DEADSTART  PP - Enter OCTAL Digit
  For Device Types --    Enter  TL - Tape (ISMT1600/IPI 1600)
                                TH - Tape (ISMT6250/IPI 6250)
                                D  - Disk
```

12. Press **I** to initiate NOS/VE. The screen displays a series of messages before switching to system mode and displays the screen as shown on the next page to prompt for your input.

13. Enter 3 to change the channel number from 1(10) to 3(10) and press <Return> to continue the deadstart process. The system then displays the physical configuration utility (PCU) prompt as follows:

    Do you want to change the physical configuration?
    Enter yes or no

14. Enter **YES** and press <Return>. The system displays the PCU/ prompt.

15. Enter **EDIPC** and press <Return> to edit the physical configuration. The system displays the PCE/ prompt.

16. Enter **CHACR CH1 CH3** and press <Return> to change the configuration reference from channel 1 to channel 3.

17. Enter **QUIT** and press <Return> to exit the Edit Phsical Configuration utility. The PCU/ prompt reappears.

18. Enter **QUIT** and press <Return> to exit the Physical Configuration. The system displays the Logical Configuration Utility (LCU) prompt as follows:

    Do you want to change the logical configuration?
    Enter yes or no

19. Enter **no** and press <Return> to proceed.

20. Either enter **no** or take the default values until the deadstart process is completed by the following message:

    -----**DEADSTART COMPLETE**------

21. Press <Alt F2> to return to console mode.

22. Enter the following sequence to display the System Options menu.

    M to select the Maintenance Main menu.
    U to select the Utilities menu.
    S to select the System Options menu.

22. Press <Return> or <Tab> three times and type C to change the NOS/VE deadstart command file location from DISK to CIP-DISK.

NOS/VE Deadstart and System Device Configuration

```
                    NOS/VE

        Copyright Control Data 1983, 1984, 1985, 1986, and 1987
@
      Deadstart and System Device Configuration Selections
 1. OS Location ......................... Alternate Disk
 2. Deadstart pause for operator input ..... False


 Deadstart and System Device

 3. Channel .....  .........  1(10)
 4. Controller and ..........  $FA7B5_A
      Storage Device ........  $9836_1
 5. Equipment Number .....  0(10)
 6. Unit Number ...........  0(10)






              NOS/VE Deadstart Command Processor
Enter a menu number to change a value or
Press NEXT to accept parameters and continue the deadstart process
@
SYSTEM MODE                              ALT-F1: Help ALT-F2: Exit
```

Reconfiguring an Adapter or Converter to a Different Channel

The factory usually sets up the adapters or converters to the predefined channels in their slots. If you need to reconfigure an adapter or converter to a different channel, update the Specify Hardware Options menu, the cable configuration map, and the NOS/VE physical configuration file. The following example shows how to reconfigure the ISMT adapter in slot 19 from channel 24 to channel 22:

1. Terminate NOS/VE and power the system off from the system console.
2. Set the service switch on the AC distribution rack from SYSTEM to OFF.
3. Remove the rear door of the mainframe and open the bulkhead panel.
4. Remove the ISMT-to-channel cable at channel 24 of backpanel slot 13 and install it to channel 20. See section-3 module, Procedure 11 - Cables and Connectors, for detailed pin locations.
5. Open the front door of the mainframe.
6. Update the ISMT channel number on the cable configuration map. The cable configuration map is inside the front door literature holder.
7. Reset the service switch to SYSTEM.
8. Close the front and rear doors of the mainframe.
9. Power the sytem on from the system console.
10. Enter the following sequence to display the Specify Hardware Options menu shown on the opposite page:

<Esc>	to return to the Console Main menu.
M	to select the Maintenance Main menu.
E	to select Engineering Tasks.
S	to select the Specify Hardware Options menu.

11. Use the arrow keys to place the cursor on the channel number of the ISMT adapter in slot 19.
12. Press <Return> several times until 22 appears.
13. Press <F3> to save the contents and exit the Specify Hardware Options menu.
14. Run the offline tape subsystem test to verify the hardware connection. Make sure the new channel number is entered in the parameter.

    If you need the procedure to run the tape test, refer to the section-2 module, Tape Deadstart Troubleshooting.

Specify Hardware Options Menu

* * * SPECIFY HARDWARE OPTIONS * * *

930 - ? ?   Model # ?   Serial # ?

SLOT #	PAK	SLOT #	PAK	CH # (octal)
01	MEM 1	15	UNUSED SLOT	- -
02	MEM 3	16	170 ADAPTER	02 02
03	MEM 0	17	ICA ADAPTER	20
04	MEM 2	18	ICA ADAPTER	00
05	CPU0 C	19	ISMT ADAPTER	24
06	CPU0 B	20	ISMT ADAPTER	04
07	CPU0 A			
08	CLOCK			
09	PAGE MAP			
10	PPUS 00-05			
11	PPUS 20-24			
12	CHANNELS 00-05			
13	CHANNELS 20-25			
14	TPM/MAC			

15. Press <Esc> to return to the console main menu and press **I** to establish NOS/VE.

16. Update the NOS/VE physical configuration file using the Physical Configuration Utility commands. See the section on the Physical Configuration Utility in the NOS/VE System Performance and Maintenance manual [Control Data publication 60463915] for details.

17. Inform the customer of the change.

Initiating a Deadstart Dump

The deadstart dump utility can dump the contents of the system's memories and maintenance registers to a magnetic tape unit. If necessary, experienced system specialists can analyze the output of the deadstart dump to isolate problems that have evaded discovery by other methods.

Following a computer system outage, either you or the operator can initiate a deadstart dump to a tape unit. The procedure assumes the following:

- The controlware is in the tape adapter. This assumption is valid only if the operating system was running before the outage.

- The dump tape device is defined in the Configure Critical Devices menu of the console. If you need to change the dump tape unit to a different tape unit, define the channel number, equipment (adapter) number, and unit number in the Configure Critical Devices menu.

How to Initiate a Deadstart Dump

1. Mount the tape in the designated tape unit. Press LOAD to load the tape and press ONLINE to ready the tape.

2. Press <Alt F2> to return to console mode.

3. Press <ESC> until the main menu appears, or press <Ctrl Alt Del> and <ESC> to access the console main menu.

4. Type **M** to select the Maintenance main menu and type **P** to initiate the deadstart dump utility. A sequence of messages indicates the progress of the process, and the console switches to system mode and displays the following:

   ```
   EXPRESS DEADSTART DUMP
   FOR THE CYBER XXX-930


   EXPRESS DUMP TAPE DENSITY 0

   1 = ISMT(639)-PE/DENSITY (1600 BPI)
   2 = ISMT(639)-GE/DENSITY (6250 BPI)
   ```

5. Type **2** to select the high density recording method or **1** to select the low density recording method. When you type **2** and press <Return>, the console displays the following:

EXPRESS DUMP TAPE DENSITY 2

CHANNEL - 04

6. Press <Return> twice and the console displays the following:

EXPRESS DUMP TAPE DENSITY 2

CHANNEL - 04

EQUIPMENT - 0

UNIT -00

(BS) - BACK TO PREVIOUS ENTRY

7. The channel, equipment, and unit numbers are defined in the Configure Critical Devices menu. If you want to change these parameters, press <Backspace> until you get to the item you want to change. Type the new number.

   If you accept the default parameter settings, press <Return>. The screen prompts you with EXPRESS DUMP NUMBER 00. Press <Return> to accept 00 asthe number or type in a number to identify the express dump. The console then displays the prompt shown below:

UNLOAD DUMP TAPE OPTION

Y - UNLOAD TAPE AFTER DUMP

N - REWIND TAPE AFTER DUMP

(CR) - UNLOAD TAPE AFTER DUMP

(BS) - BACK TO PREVIOUS ENTRY

8. Press <Return> to select the default parameter and start the dump.

9. When the screen displays the message DUMP 00 COMPLETE, dismount the tape from the tape unit.

Reloading Central Memory from a Deadstart Dump Tape

To reload the central memory from a deadstart dump tape for fault analysis, first terminate NOS/VE and set up the system option parameters before reinitiating NOS/VE. The procedure assumes you have the deadstart dump tape available.

1. Terminate NOS/VE if it is not terminated.

2. Press <Alt F2> to return to console mode. Press <Esc> until the Console Main menu appears.

3. Press **M**, **U**, **S**, and then <PgDn> to display the second page of the system options menu, Initiate NOS/VE Options, shown below.

```
                 "INITIATE NOS/VE" OPTIONS               PAGE 2 of 2

FORCE HARDWARE INITIALIZE .......................        NO
   INCLUDE DIAGNOSTIC TESTING ......................     NO
   PERMIT DEGRADES ON ERROR ........................     NO
ENABLE MDD UTILITY ..................................    NO
LOAD MICROCODE .......................................   YES
PERFORM CM RELOAD FROM .........................         NO
   DEADSTART DUMP TAPE

                  "CONSOLE OPTIONS"

ENABLE AUTOMATIC POWER ON ..........................     YES


Valid Entries: YES, NO
```

4. Change PERFORM CM RELOAD FROM DEADSTART DUMP TAPE from **NO** to **YES**.

5. Press <F3> to save the change.

6. Press <Esc> until the Console Main menu appears.

7. Press **I** to initiate NOS/VE.

8. When the screen isplays the tape unit channel, equipment, and unit numbers and prompts you to mount the deadstart dump tape, mount the deadstart dump tape to the designated tape drive and ready the drive.

```
                    INITIATE NOS/VE

                     CIP LOCATION

                       CH   = 01
                       EQ   = 00
                       UN   = 00
                       TYPE = FSD

        (Defined by Critical Device Configuration)

           Maximum Memory Used      = 16 MB
           Maximum Memory Available = 64 MB

  Reload central memory from deadstart dump tape selected.
  Mound DEADSTART DUMP tape on Drive CH=04 EQ=00 UN=00
  Enter RETURN when ready or ESC to abort.
```

9. Press <Return> to proceed.

NOTE

After the reload operation is complete, you do not need to reset the system options menu. The console software automatically returns to the default value. Any subsequent NOS/VE initialization proceeds in the usual way.

Accessing Maintenance Software Products by way of CML/VE

Concurrent Maintenance Library for the Virtual Environment (CML/VE) is a set of procedures that uses menu displays to provide you with the following:

- An easy way to access online maintenance products such as
  - Hardware Performance Analyzer for the Virtual Environment (HPA/VE)
  - Maintenance Application Language for Equipment Testing for the Virtual Environment (MALET/VE)
  - Diagnostic Virtual System (DVS)
- A set of utilities to display and manage system maintenance features such as hardware configuration, terminal definition, and help facility.

Initiate CML/VE and select the maintenance software product of your choice from the menu. Then refer to subsequent pages for the detailed running procedure for each maintenance software product.

Requirements for Initiating CML/VE

- Read and write access to the SYSTEM HARDWARE_MAINTENANCE catalog.
- User number or account number must have the job class attributes of interactive, batch, and maintenance.

Consult the customer-site administrator or operator to fulfill these requirements or have them initiate CML/VE for you.

Initiate CML/VE

After logging onto NOS/VE according to procedures at each site, initiate CML/VE as an interactive NOS/VE user by typing CML.

If you are initiate CML/VE from the system console, type in the following at the system prompt @:

Create_command_list_entry E=$system.hardware_maintenance.dvs.dvs_command_library

or

Set_command_Library A=$system.hardware_maintenance.dvs.dvs_command_library

Press <Return>, type CML, and press <Return>.

Press <F9> twice to expand the main operator window.

If you successfully initiate CML/VE, the main menu is displayed as shown in the example. If you cannot initiate CML/VE, refer to the CML/VE Reference Manual [Control Data publication 60000019] for details or consult your site administrator or operator.

An Example of the CML/VE Main Menu

```
CML_000 - CML/VE MAIN MENU - Version ??

1. MALET/VE (Peripheral Diagnostics)
2. HPA/VE (Hardware Error Reports)
3. DVS (Mainframe Diagnostics)
4. Configuration Utility (Display Hardware/Software Configuration Data)
5. Terminal/User Definition Utility (Display/Alter Terminal/User Definition)
6. NPA (Network Performance Analyzer)
7. CDCNET Utility (Online Diagnostics and Status Displays)
8. CML/VE Toolbox (Site/Local Generated Maintenance Procedures)
9. QUIT/END (Exit CML/VE)

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

To access the software product of your choice, enter the corresponding number after the **CML** prompt and press <Return> or <Enter>.

Several CML/VE menus require that you enter the element name of the device to be tested. The element name must be a legal device name in the operating system's active logical configuration.

You can obtain a display of the contents of the active logical configuration by selecting CML/VE Configuration Utility from the main menu. Under this utility, you can gain knowledge of a particular system's hardware configuration and place elements in a defined maintenance state (ON / DOWN / OFF) so that NOS/VE and the maintenance software products can use the element.

An experienced user can initiate MALET/VE, HPA/VE, and DVS independently of CML/VE. Refer to the appropriate reference manual in the preface for the procedures for initiating these products.

Displaying Error Incident Reports from HPA/VE

Hardware performance analyzer/virtual environment (HPA/VE) monitors the operation of each active hardware element in the system. When it detects a hardware element that exhibits abnormal operation, such as solid failure or a high rate of recovered errors, it analyzes the most recent logged error data for that hardware element and produces an error incident report.

An error incident report contains an analyzed summary of error data, the suspected cause of the errors, and possibly a recommended repair action. Examine the report(s) to determine the following:

- An element needing repair that could bring the system down.
- Maintenance actions to take for the failing element.

To display error incident reports, access HPA/VE by way of CML/VE. If you have not initiated CML/VE yet, refer to previous pages for the procedure.

Accessing HPA/VE

The following is an example of the HPA/VE menu display at the console. When you type **2** and press <Return> at the **CML?** prompt of the CML/VE main menu, you see this display.

```
CML_200 - HPA/VE MENU

1. Access HPA/VE menus.
2. Change HPA/VE parameters.
3. Initialize HPA/VE parameters.
4. Process Current NOS/VE System Engineering Log.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

NOTE

Before accessing the HPA/VE main menu and getting the most updated report, select *Process Current NOS/VE System Engineering Log* for immediate processing by HPA/VE of error entries and usage entries from the current System Engineering Log.

To view an error incident report for a particular element or device, you need the logical element name or product identifier. Select CML/VE Configuration Utility from the CML/VE main menu to obtain it.

When you type **1** and press <Return> at the prompt, the HPA/VE main menu is displayed as shown in the example.

```
HPA/VE MAIN MENU              HPA/VE  02.21

 1. Access SQC Data                             CURRENT VALUES ARE:
 2. Display Index
 3. Display Reports (default)                   screen length = XX
 4. Generate Maintenance Report                 start date    = YY-MM-DD
 5. Manage Report Database                      end date      = YY-MM-DD
 6. Print Index
 7. Print Reports
 8. Set Start/End Dates
 9. Set Screen Length
10. Update_Text/Close/Reopen Report
11. Quit/End
12. Additional Selections

ENTER NUMBER OF SELECTION                       or HELP
HP?
```

Displaying Error Incident Reports

Take the following steps to view the error incident reports of your choice:

1. Select Display Reports from the HPA/VE main menu to display the followings elections:

```
                DISPLAY REPORTS SELECTION OPTIONS

                                          Current selections are:
 1. Report Status                            report status = OPEN/CLOSED
 2. Report Type                              report type  = ERROR/MAINT

 3. All (default)                         Options 3 thru 6 select only
 4. Report Number                         reports that meet the current
 5. Element Name                          selections of report type and status.
 6. Product Identifier

 ENTER NUMBER OF OPTION                   or BACK/HELP/MAIN_MENU
 HP?
```

2. Ensure that you select from this menu the current report status and report type that are in the upper right corner of the menu. Select Report Status and Report Type. Use the following guidelines to change the current options.

Report Status

You can change the current report status on the Report Status menu by selecting one of the following:

- Only Open reports (default)
- Only Closed reports
- Both Open and Closed reports

All error incident reports generated by HPA/VE are Open. However, maintenance personnel, after looking at the report and performing the required repair action, can change individual reports to Closed. For intermittent problems, select both Open and Closed reports for a better analysis of the problem. For any other problem, select Only Open reports.

Report Type

You can change the current report type on the Report Status menu by selecting one of the following:

- Only Error reports (default)
- Only Maintenance reports
- Both Error and Maintenance reports

The maintenance report generated by maintenance personnel contains all vital information associated with a particular hardware element or kind of equipment. For intermittent or complicated problems, select Both Error and Maintenance reports for better analysis. For other problems, select Only Error reports.

3. a. Select All to view all reports that meet the current report status, and calendar start and end data criteria given on the main HPA/VE menu. Select All when you want to know whether or not deferred maintenance is required for the system, or want to know the logical element's name or identifier.

   To page through the reports, enter the display mode commands listed at the bottom of each display (+, -, F, B) at the **HD?** prompt. The display mode commands function as follows:

+	Advance to the next display.
-	Move backward one display.
F	Advance to the first page of the next report.
B	Move back to the first page of the previously displayed report.

3. b. Select Report Number, Element Name, or Product Identifier to view a specific group of reports that meet the current report status, report type, and calendar period criteria. When selecting any one of these options, you must provide the following corresponding prompting information:

Report Number	Prompts you to enter report numbers or a range of report numbers.
Element Name	Prompts you to enter the element name(s).
Product Identifier	Prompts you to enter the product identifier.

To page through reports under any one of these options, use the display mode commands in step 3 a.

4. If you have the optional printer, enter <Shift PrintScrn>, to print the displayed report(s) at the console, or send the report to the system lineprinter through item 7, Print Reports, of the HPA/VE main menu.

Running Peripherals Diagnostics from MALET/VE

Except for the system-critical peripheral that holds the operating system, all diagnostics for the nonsystem-critical peripherals are run online on a concurrent maintenance basis using MALET/VE. Expert users can refer to the MALET/VE Reference Manual [Control Data publication 60461940] for detailed procedures for accessing MALET/VE and for executing diagnostics by command. An easier procedure for accessing MALET/VE by way of CML/VE and running peripherals diagnostics is as follows:

Accessing MALET/VE

It is assumed here that the peripheral to be tested is placed in a Down or On state, that you have initiated CML/VE using the procedure from the previous page, and that you have the following CML/VE main menu (an example) displayed at your console:

```
CML_000 - CML/VE MAIN MENU -- Version ??

1. MALET/VE (Peripheral Diagnostics)
2. HPA/VE (Hardware Error Reports)
3. DVS (Mainframe Diagnostics)
4. Configuration Utility (Display Hardware/Software Configuration Data)
5. Terminal/User Definition Utility (Display/Alter Terminal/User Definition)
6. NPA (Network Performance Analyzer)
7. CDCNET Utility (Online Diagnostics and Status Displays)
8. CML/VE Toolbox (Site/Local Generated Maintenance Procedures)
9. QUIT/END (Exit CML/VE)

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Select MALET/VE at the **CML?** prompt and press <Return> to access the MALET/VE menu. This menu, shown in the example opposite, provides access to MALET/VE on two levels.

Select Execute a MALET Diagnostic or Utility on a NOS/VE device and press <Return> at the prompt to display the MALET Diagnostics menu.

From the MALET Diagnostics menu that lists all peripheral diagnostics, you can select a specific diagnostic to be executed by CML/VE using MALET/VE. The CML/VE procedure presets all MALET/VE commands; you interact directly with MALET/VE only when a diagnostic-detected error occurs.

```
CML_100 -- MALET/VE MENU

1. Execute MALET in expert (Command) mode.
2. Execute a MALET diagnostic or utility on a NOS/VE device.
3. Execute a MALET diagnostic or utility on an unconfigured device.
4. Verify MALET/VE installed.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Running Peripherals Diagnostics

At the prompt of the MALET Diagnostic menu, select the number of the peripheral diagnostic you want to execute. The following diagnostics are available for the peripherals in this system.

Peripheral	Name of Diagnostic
Tape Subsystem	ISW - 639/9639 Tape Drive Diagnostic ITW - 7221/639/9639 Tape Subsystem Utility I9X - 5698 Tape Diagnostic
Disk Subsystem	IDT-9836/9853/CM3 Data Path Test

Press <Return> to execute the diagnostic. The next screen prompts you for required parameter data and the element name of the device to be tested. If you are unsure of the element name, obtain it from the CML/VE Configuration Management Utility that is accessible from the CML/VE main menu. If you need help in providing a name during a terminal session, call the Help Facility.

If you need to degrade the element to the DOWN state in order to run the diagnostic, refer to the module, Degrading the System and Reinstating Degraded Elements.

Running CPU and System Diagnostics from DVS

DVS is a NOS/VE command utility that controls execution of online diagnostic tests of the CPU, central memory, and peripherals. Using CML/VE, you can access DVS and execute the diagnostics either with predefined procedures or with DVS Command. If you want to execute diagnostics in expert (Command), interactive, or batch mode, refer to the Diagnostic Virtual System (DVS) Usage Manual [Control Data publication 60469720], and to the Concurrent Maintenance Library Virtual Environment (CML/VE) Reference Manual [Control Data publication 60000019] for details. To run diagnostics through CML/VE, proceed as follows.

Accessing DVS

It is assumed here that you have initiated CML/VE and that you have the CML/VE main menu displayed at your console. To access DVS, select DVS and press <Return> at the prompt. The DVS menu is displayed when DVS has been accessed as shown in the following example:

```
CML_300 - DVS MENU

1. Execute a CPU Diagnostic.
2. Execute a System Diagnostic.
3. Execute DVS in Expert (Command) Interactive Mode.
4. Execute DVS in Expert (Command) Batch Mode.
5. Manage DVS History File.
6. Access the DVS Online Manual.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Executing CPU Diagnostics

1. Select Execute a CPU Diagnostic and press <Return> at the prompt of the DVS menu to display the DVS CPU Diagnostics menu shown in the example at the top of the next page.

2. Select the diagnostic you want and press <Return> to execute.

NOTE

Diagnostics 18, 19, and 20 are not part of this computer system.

```
CML_310 - DVS CPU DIAGNOSTICS MENU

 1. BIMM (BDP Immediate Test)              11. HIMM (Half Word Immediate Test)
 2. BRCH (Float. Point Branch Test)        12. KYPT (Keypoint End-Case Test)*
 3. BYTE (Byte End-Case Test)*             13. NUMR (BDP Numeric Test)*
 4. DBUG (Debug Test)*                     14. RCT1 (Random Command Test 1)
 5. DOBL (Dbl. Prec. FP Test)              15. RCT2 (Random Command Test 2)
 6. EDIT (BDP End Case Test)*              16. RFST (Random Fast/Slow Test)
 7. FCT3 (Fixed Command Test 3)            17. SNGL (Sgl. Prec. FP Test)
 8. FIMM (Full Word Immediate Test)        18. VINT (Vector Integer Test)
 9. FINT (Full Word Integer Test)          19. VCMP (Vector Compare Test)
10. HINT (Half Word Integer Test)          20. VGTH (Vector Gather/Scatter Test)
                    21. Run all tests (except *) in sequence.

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

Executing System Diagnostics (Confidence Test)

1. Select Execute a System Diagnostic and press <Return> at the prompt of theDVS menu. The DVS System Diagnostics menu that is similar to the following example is displayed:

```
CML_320 - DVS SYSTEM DIAGNOSTICS MENU

1. CMEM (Central Memory Test)
2. DISK (Disk Subsystem Validation Test)
3. TAPE (Tape Subsystem Validation Test)-(Tape VSN = DVS will be requested)
4. COMCT (CDCNET Communications Confidence Test)

Enter the number of an option, or type a command (BACK / MAIN_MENU / HELP).
CML?
```

2. Select the test you want and press <Return> to execute it.

NOTE

For security reasons, you cannot run the DISK and COMCT tests from the system console. However, you can run these tests from a terminal. Ask the system administrator to validate you as a user and give you the maintenance access privilege.

Running System Validation Suite

The System Validation Suite (SVS) tests the hardware features using NOS/VE by executing operating system functions, test jobs, and online hardware diagnostics.

If you execute SVS to validate the peripherals, all disk drives and tape units must be powered on.

Initiate System Validation Suite

1. Ensure that the correct level of CYBER Initialization Package is installed on the system and that no other customer's job is running.

2. Press I at the console main menu to initiate NOS/VE. The deadstart process is automatic and takes several minutes. When you see either one of the following messages, the deadstart is complete:

   ------SYSTEM ACTIVATION COMPLETE-----

   or

   ------DEADSTART COMPLETE-----

   NOTE

   If the top of the screen changes to NOS/VE Deadstart Command Processor with an **Enter system core commands** prompt and without any further progress, press <F7>, type **AUTO**, and press <Return> to process.

3. Enter one of the following and press <Return>:

   create_command_list_entry E=$system.svs.command_library

   or

   set_command_library A=$system.svs.command_library

4. Enter one command from the following table and press <Return>:

Command	**Description**
estse verification	Executes mainframe and peripherals tests.
estse mainframe	Executes mainframe tests.
estse peripherals	Executes peripherals tests.
estse all	Executes mainframe and peripherals tests.

NOTE

After you enter the command and SVS is successfully established, the following screen appears.

```
                         Main Operator Window

RUNSVS initiates testing.     The possible formats are shown below:

   RUNSVS  FOR            INTEGER VALUE   PASSES or HOURS or
                                          MINUTES
           UNTIL          CLOCK HOUR (1-12)   AM or PM
           CONTINUOUSLY (RUNS UNTIL YOU TYPE TERMINATE)

EXAMPLES: RUNSVS FOR 72 HOURS, RUNSVS UNTIL 12 PM, RUNSVS FOR 2
PASSES
VE displays can be changed by entering the following commands:

VED AJ displays active jobs     VED SL displays the system log
VED DS displays device status   VED MS displays mass storage status
```

5. If you are running SVS using CIP L688, skip this step. Enter the following command to set the job class limits to 50. Press <Return>:

   setjcl maintenance 50

6. Enter one of the NOS/VE command according to the software level to specify the time and press <Return>:

Command NOS/VE L 1.3.1 and up	**Command** NOS/VE 1.2.3	**Description**
runsvs for 1 pass	onepass	Runs one pass of SVS: approximately one hour for mainframe tests and 30 minutes for peripheral tests.
runsvs for *X* passes		Runs *X* passes of SVS, where *X* is the number of passes.
runsvs for *hh* hours	onehour	Runs SVS for hour(s) specified.
runsvs for *mm* minutes		Runs SVS for minutes specified.
runsvs until *hh yy*	timed *hhmm*	Runs SVS until the time specified, where *hh* is hour, *yy* is either AM or PM, and *mm* is minutes.
runsvs continuously		Runs SVS continuously until you stop it from the console with the command **terminate**.

If the peripherals tests are selected, approximately ten minutes after SVS begins, the system issues an audible beep and prompts you in the operator action display window for tape information before executing the tape test.

7. Mount the scratch tapes to the specified tape drives and place the tape drive online. Make sure each tape has a write ring.

If System Validation Suite Fails

When testing is complete, the bottom window of the console displays the message **TESTING COMPLETED** with either **PASSED** or **FAILED** in large block letters.

HPA/VE runs automatically to capture intermittent or corrected hardware failures. If failures occurred, job logs and/or job test case failure data print on the system printer.

You may examine the data using the FAILURES and SCAN_OUTPUT_QUEUE commands. For scrolling control, press <Ctrl S> to stop screen scrolling and <Ctrl Q> to resume scrolling.

If you want to know more SVS commands, type **HELP** to display a list of available SVS commands. If a console printer is available, press <Shift PrintScrn> to print the online screen.

If NOS/VE hangs, press <Alt F2> to return to console mode. Then take a deadstart dump according to the procedure in the module, Initiating a Deadstart Dump, in this section. If further troubleshooting using the offline diagnostics does not isolate the fault to a replaceable unit, escalate to the next level of support.

To exit SVS, type **quit**.

If you require additional help, contact Customer Support Services at one of the following telephone numbers:

- United States: (800) 345-9904
- Canada: (800) 345-9903
- International (includes Alaska and Hawaii): (612) 851-4131

Other Helpful NOS/VE Commands

VED AJ	Opens a shared window in the middle of the screen to show all active jobs.
VED MS	Opens a shared window in the middle of the screen to show available disk space.
DISSJ	Displays current status of swapped jobs in the main operator window.
DISAO	Displays output queue contents.
DISAI	Displays input queue contents.

Other Helpful SVS Commands

If you want to see the parameters for the following commands, type DISCI [command_name].

RUNHPA	Processes the Engineering logs and runs an HPA/VE report.
RUN_MST	Runs the MST test on drive with specified VSN. You can obtain the VSN of a drive from the VED DS display.
SCAN_HISTORY	Displays a history file containing all test session results since deadstart or a RESET_HISTORY command.
RESET_HISTORY	Creates a new history file. You may want to do this before restarting testing.
PRINT_HISTORY	Puts the history file in the output queue.
TERMINATE	Ends the testing session and displays the results. This interrupts the running test and prevents execution of further tests.
QUIT	Exits the SVS utility.

Updating Console Software

Use the following procedure to update the console software. The process also includes updating the backup/recovery diskette. If you are reloading the entire CIP, update the console software before you install or update the CIP components and NOS/VE boot program.

1. Terminate NOS/VE and return to console mode.

2. Insert the 930/932 Local Console Diskette 1 into drive A. Close the drive latch.

3. If you are updating CIP Level 700 or earlier, skip steps 4 and 5. If you are updating CIP Level 703 or later, skip steps 6 and 7.

4. Press **M** and then **U** from the console main menu to display the Utilities menu shown below:

```
            UTILITIES
Select System Options
Configure Critical Devices
Modify Console Security Options
Install CIP Components
Update CIP Components
NOS/VE Boot Installation
Update Console Software
```

5. Press **P** to select Update Console Software menu. The following warning appears:

```
WARNING: This utility will overwrite existing console software
on directory CONSOLE. To start, insert Disk number 1 into drive
A and enter RETURN.
```

6. Press the following sequence to start the installation process:

<Alt F10> then **Y**	To enable maintenance mode.
<Alt Q> then **Y**	To confirm exit to DOS.

7. Enter **A:INSTALL.**

8. Press <Return>. The console displays the following message :

   To proceed: Press return (CR) at the next prompt, OTHERWISE

   To terminate: Press ESC or CTRL BREAK.

   Console Disk #1 CDC P/N 19?????? must be in Disk Drive A:

   This procedure takes about 4 minutes to build the CONSOLE software. Please do not interrupt this process.

   Press RETURN to continue . . . ESC to abort

9. Make sure that the console diskette 1 part number (P/N 19??????) is the same as shown in the console display and press <Return>. The system transfers files from the diskette to the hard disk CONSOLE directory. When finished, it prompts you to insert the next diskette.

10. Follow the prompts until all console diskettes have been processed. Because the console software is distributed in compressed form, the console goes into an uncrunching routine to return the software to normal form.

11. If the installation program detects that the hard disk does not contain console data files, it prompts you to insert the first data file diskette to proceed. Follow the prompts until all console data diskettes have been processed.

12. When the install program prompts you to insert Backup/Recovery diskette 2, remove the write protect tab on the second diskette marked Backup/Recovery Operating Software before you insert the diskette in drive A.

13. Close the drive latch and press <Return> to copy the data tables to the Backup/Recovery diskette 2.

14. When the copy is complete, remove the diskette, replace the write protect tab, and return it to its envelope for safe keeping.

15. When the message: **Console Software Now Installed** appears. press <Return> to reboot the console and display the Console Main menu.

Updating or Installing CIP Components

A CYBER Initializing Package (CIP) contains software programs for initializing the CYBER 930/932. As these programs change, a new CIP tape that is recorded in phase encoded (PE) mode is released and distributed to all 930/932 computer sites. To update or install CIP components, contact the computer site to schedule dedicated machine time.

The following procedure applies only to updating or installing the CIP tape to the disk. If you are reloading the entire CIP, load the console software **before** installing the CIP tape and the NOS/VE boot programs. Refer to section 3 module, Installing Console Software, or the CIP 930/932 V9 L703 Software Release Bulletin for the procedure. If you are also installing NOS/VE, refer to the NOS/VE Software Release Bulletin for the procedure.

Prerequisites for CIP Installation or Update

The installation process installs the CIP modules to the deadstart system disk or updates CIP on the deadstart disk. Therefore, the procedure assumes the following:

- One tape drive and the deadstart disk are available;
- Peripheral controlware is loaded. If you are not sure, initiate NOS/VE. The initialization process loads the peripheral controlware automatically;
- The installation process reinitializes the deadstart disk. If you are installing CIP, make sure the operator backs up any information from the deadstart disk that the operator wants to save.

Updating or Installing CIP

1. If NOS/VE is running, ask the operator to terminate NOS/VE.
2. Press <Alt F2> to return to console mode. Press <Esc> until the main menu appears.
3. Press **M** and then **U** to display the utilities menu:

```
          UTILITIES
Select System Options
Configure Critical Devices
Modify Console Security Options
Install CIP Components
Update CIP Components
NOS/VE Boot Installation
Update Console Software
```

4. Press **C** to display the Configure Critical Devices menu. Verify that the CIP LOCATION device type is DISK and the INSTALL FROM device type is ISMT1600 as shown in the figure of the Configure Critical Devices menu.

Configure Critical Devices Menu

*** Configure Critical Devices ***

DEVICE	CH	EQ	UN	DEVICE TYPE
CIP LOCATION	01	00	00	DISK
INSTALL FROM	??	0?	0?	???? 1600
DUMP TO / RELOAD FROM	??	0?	0?	???? 1600

DIAGNOSTIC
DEADSTART PP = 00

Valid Entries:
For CH, EQ, UN and DEADSTART PP - Enter OCTAL Digit
For Device Types - Enter TL - Tape (ISMT 1600/IPI 1600)
TH - Tape (ISMT 6250/IPI 6250)
D - Disk

5. Enter the channel, equipment, and unit numbers for the designated drive in the INSTALL FROM line and press <F3> to return to the Utilities menu. If the line shows the correct entries, press <Esc> to return to the Utilities menu.

6. Press **I** to install CIP or **U** to update CIP.

7. When the console prompts you to mount the CIP tape on a specific tape drive. Mount the CIP tape and place the tape drive online.

8. Press <Return> to start the process. The console automatically completes the process, ending in system mode with the message INSTALLATION COMPLETE.

9. Press <Alt F2> to exit system mode and return to the Utilities menu in console mode.

If Update or Installation Fails

If the CIP update or installation fails, the console displays the Common Test and Initialization (CTI) error message or the contents of the A and P registers. You should always repeat the procedure to verify the error condition or recover from the error.

If the same error message returns, record the message and refer to the subsequent module, Interpreting CTI Error Messages, for maintenance action. If the console returns the same contents of the A and P registers, refer to the section 2 module, Tape Coldstart Troubleshooting.

Installing NOS/VE Boot Programs

The CIP tape installation or update process does not load the NOS/VE boot programs. After installing or updating CIP components, install the NOS/VE boot programs.

Prerequisites for NOS/VE Boot Installation

The installation process installs the NOS/VE boot programs to the deadstart system disk. The procedure assumes the following:

- One tape drive and the deadstart disk are available;
- The CIP tape containing NOS/VE boot programs is available;
- NOS/VE is not running.

Installing NOS/VE Boot Programs

1. If you install NOS/VE boot programs right after CIP update or installation, press <Alt F2> to return to the Utilities menu. Skip steps 2 through 5.
2. Press **M** to select Maintenance from the Main menu.
3. Press **U** to display the Utilities menu:

```
            UTILITIES
Select System Options
Configure Critical Devices
Modify Console Security Options
Install CIP Components
Update CIP Components
NOS/VE Boot Installation
Update Console Software
```

4. Press **C** to display the Configure Critical Devices menu. Verify that the CIP LOCATION device type is DISK and the INSTALL FROM device type is ISMT1600 as shown in the figure of the Configure Critical Devices menu.
5. Enter the channel, equipment, and unit numbers for the designated drive in the INSTALL FROM line and press <F3> to return to the Utilities menu. If the line shows the correct entries, press <Esc> to return to the Utilities menu.
6. Press **N** to select NOS/VE Boot Installation.

Configure Critical Devices Menu

*** Configure Critical Devices ***

DEVICE	CH	EQ	UN	DEVICE TYPE
CIP LOCATION	01	00	00	DISK
INSTALL FROM	??	0?	0?	???? 1600
DUMP TO / RELOAD FROM	??	0?	0?	ISMT 1600

DIAGNOSTIC
DEADSTART PP = 00

Valid Entries:
For CH, EQ, UN and DEADSTART PP - Enter OCTAL Digit
For Device Types - Enter TL - Tape (ISMT 1600/IPI 1600)
TH - Tape (ISMT 6250/IPI 6250)
D - Disk

7. When the console prompts you to mount the NOS/VE boot tape on a specific tape drive, mount the CIP tape and place the tape drive online.

8. Press <Return> to start the process. The console automatically completes the process, ending in system mode with the message INSTALLATION OF THE NOS/VE BOOT PROGRAMS COMPLETE.

9. Press <Alt F2> to exit system mode and return to the Utilities menu in console mode.

If Installation Fails

If the installation fails, the console displays the Common Test and Initialization (CTI) error message. You should always repeat the procedure to verify the error condition or recover from the error.

If the same error message returns, record the message and refer to the module, Interpreting CTI Error Messages, for maintenance actions.

To install or update the microcode into the control module of the disk subsystem, you must terminate NOS/VE and take a deadstart to the Common Test and Initialization (CTI) utility. Use CIP installation tape part 19270109, revision G or later, that contains the required level of microcode record MH426 for the following installation or update procedure:

1. If NOS/VE is running, ask the operator to terminate NOS/VE.

2. Press <Alt F2> to return to console mode. Press <Esc> until the main menu appears.

3. Press **M** and then **U** to display the utilities menu shown below:

```
        UTILITIES
Select System Options
Configure Critical Devices
Modify Console Security Options
Install CIP Components
Update CIP Components
NOS/VE Boot Installation
Update Console Software
```

4. Press **C** to display the Configure Critical Devices menu. Change the CIP LOCATION line to the values shown in the figure below. Verify that the INSTALL FROM line is the same as the CIP LOCATION line. If the designated drive is unit 01, change the unit number (UN) of both lines to 01.

*** Configure Critical Devices ***

DEVICE	CH	EQ	UN	DEVICE TYPE
CIP LOCATION	**04**	**00**	**00**	**ISMT 1600**
INSTALL FROM	**04**	**00**	**00**	**ISMT 1600**
DUMP TO / RELOAD FROM	0?	0?	0?	ISMT 1600

DIAGNOSTIC
DEADSTART PP = 00

Valid Entries:
For CH, EQ, UN and DEADSTART PP - Enter OCTAL Digit
For Device Types -- Enter TL - Tape (ISMT 1600/IPI 1600)
TH - Tape (ISMT 6250/IPI 6250)
D - Disk

5. Mount the CIP tape to the designated tape drive and ready the drive.

6. Press <F3> to return to the Utilities menu.

7. Type one of the following sequences to either select Load CM3 Microcode or initiate a CTI deadstart. If you select the Load CM3 Microcode menu, skip steps 8 and 9.

<Esc>	To return to the Maintenance menu
E	To select Engineering Tasks menu
L	To select Load CM3 Microcode

or

<Esc>	To return to the Maintenance menu
E	To select Engineering Tasks menu
T	To select Technical Support Functions
<Return>	To proceed
C	To initiate a CTI deadstart and display the CTI Initial Options menu shown below:

```
            INITIAL OPTIONS

     B      BUILD DEADSTART
            DISK
     U      UTILITIES
     H      HELP

     (CR)   BUILD DEADSTART
            DISK
```

8. Enter **U** to display the Utilities menu shown below:

```
            UTILITIES

  L      DISPLAY CIP COMPONENT
         INFORMATION

  M      DISK SUBSYSTEM
         MICROCODE LOAD

  (CR)   BUILD DEADSTART DISK
         INFORMATION
  (BS)   PREVIOUS DISPLAY
```

9. Enter **M** to load microcode to the disk subsystem. The console prompts you with three separate displays requesting channel, equipment, and unit numbers. The following display is a composite of the three displays for completing steps 10 through 12.

> CM3 SYSTEM
> MICROCODE INSTALLATION UTILITY
>
> ENTER CONTROL MODULE ADDRESS
>
> CHANNEL -- *01*
>
> EQUIPMENT -- *0*
>
> UNIT -- *10*
>
> (BS) -- BACK TO PREVIOUS ENTRY

10. Enter the channel number (octal) where the selected CM3 is connected and press <Return>.

11. Enter equipment number as **0** and press <Return>.

12. Enter the two-digit unit number that has the following definition:

UNIT -- ? ?

First ?	Second ?
Unit number of the CM3 displayed on the module front panel (0 through 4).	Unit number of any disk drive that is connected to the selected CM3. The drive must be ready and in good operating condition.

13. Press <Return> to proceed. If the following screen displays, press <Return> again to proceed.

> ENTER TAPE TYPE -- 2
> (2 = 963X)

The next screen prompts you with three separate displays requesting channel, equipment, and unit numbers. The figure opposite is a composite of the three displays for completing step 14.

```
ENTER TAPE TYPE -- 2
(2 = 963X)

CHANNEL -- 04
EQUIPMENT -- 0
UNIT -- 00
(BS) -- BACK TO PREVIOUS ENTRY
```

14. Enter the channel, equipment, and unit numbers of the tape drive. The numbers you enter should be the same as the INSTALL FROM line of the Configure Critical Devices menu in step 4.

15. Press <Return> to proceed. The tape drive begins to search for the microcode record and the console informs you with a SEARCHING TAPE FOR MH426. PLEASE WAIT message. When the record is found, the following screen appears:

```
TAPE = REV ?A
CM  1 = REV ?A

ENTER (CR) TO CONTINUE, OR
(BKSP) TO SELECT A DIFFERENT
CONTROL MODULE
```

16. Check the microcode revision levels of the tape and control module. If they are the same, go to step 19. If the wrong control module is selected or if you want to check the microcode level in another control module, use the backspace feature to respecify the control module.

17. Press <Return> to start the microcode installation from the tape to the specified control module.

    The console displays a VERIFYING LOAD. PLEASE WAIT message. The loading takes about four minutes. When installation is complete, the following display appears:

```
INSTALL COMPLETE

ENTER (CR) TO PROCESS
ANOTHER DEVICE
```

18. If you need to update or install microcode to other control module, press <Return> to proceed.

19. Press <Alt F2> to exit CTI (system mode) and return to this Technical Support Functions menu:

```
TECHNICAL SUPPORT FUNCTIONS

Diagnostics
Options for Deadstart
Fault Injection Utility
Initialize Hardware
CTI Deadstart
```

20. Enter the following sequence to display the Configure Critical Devices menu:

<Esc>	To return to Engineering Tasks menu
<Esc>	To return to Maintenance menu
U	To display the Utilities menu
C	To display the Configure Critical Devices menu

21. Change the CIP LOCATION line to the original settings shown in figure on the next page.

22. Remove the CIP tape from the tape drive and return it to the operator.

*** Configure Critical Devices ***

DEVICE	CH	EQ	UN	DEVICE TYPE
CIP LOCATION	01	00	00	DISK
INSTALL FROM	0?	0?	0?	???? 1600
DUMP TO / RELOAD FROM	0?	0?	0?	ISMT 1600

DIAGNOSTIC
DEADSTART PP = 00

Valid Entries:
For CH, EQ, UN and DEADSTART PP - Enter OCTAL Digit
For Device Types -- Enter TL - Tape (ISMT 1600/IPI 1600)
TH - Tape (ISMT 6250/IPI 6250)
D - Disk

If Microcode Installation Fails

If the installation fails and the INSTALL COMPLETE message does not appear during step 17, the console displays the CTI error message.

Always repeat the procedure to verify the error condition or recover from the error. If the same error message returns, see the next module, Interpreting CTI Error Messages, for maintenance action. If recovery is impossible, replace the control module.

The following table contains an alphabetical listing of the error messages that may appear during an update or install operation using the Common Test and Initialization (CTI) utility. Only the error messages that require your maintenance action are listed here.

CTI Error Messages (Sheet 1 of 2)

Message	Description	Maintenance Action
CHANNEL IS TURNED OFF	The selected channel is turned off and cannot be used to access the tape or disk.	Turn on the selected channel using the Global Function menu. See the module, Degrading the System and Reinstating Degraded Elements, for the procedure.
CIP COMPONENT XXXX NOT FOUND	CIP component XXXX in the common disk area is missing.	Use the correct CIP level tape. If retry fails, escalate to next level of support.
CPU X NOT RESPONDING	CPU X does not respond to a function request within one second.	Retry the operation. If retry fails, execute board-level diagnostics according to the slots of the CPU paks.
CTI CYLINDER OVERFLOW	Space available on the CTI cylinder is insufficient for the entire CTI file.	A disk error may cause this problem. Run offline disk diagnostics using the status/fault display board at the front of the disk drive. See the FSD Hardware Maintenance Manual [Control Data publication 83325610] for the procedure.
CTI REQUIRES CONSOLE REVISION L???? FOR PROPER EXECUTION <RETURN> TO CONTINUE	Unable to deadstart with this level of console software.	Ask the operator to load the correct console software level and redeadstart. If you need to load the console software, see section-3 module, Installing Console Software, for the procedure.
DEADSTART ABORTED	Deadstart cannot continue due to error.	If redeadstart is unsuccessful, select and execute Run Mainframe Diagnostics.
DEADSTART SECTOR READ ERROR	A read error is detected on the deadstart sector of the selected CIP device.	Retry deadstart operation. If retry fails, either escalate to next level of support or replace the CIP disk. After replacing the disk, install CIP from tape.
DISK STATUS ERROR STATUS=XXXX	The general status word XXXX received from the disk indicates an error condition exists.	If retry fails, executes the offline disk test according to the procedure in section-2 module, Disk Deadstart Troubleshooting. If the disk test passes, retry the operation. If retry fails with the same message, interpret the general status word and take action according to the section-2 module, IPI Driver-Detected Error.

CTI Error Messages (Sheet 2 of 2)

Message	Description	Maintenance Action
INSTALL ABORTED DUE TO DEVICE ERROR INFORM CE (CR) TO PROCESS DIFFERENT DEVICE	Error encountered during installation. Press <Return> to select a device or deadstart to exit.	If the device is a disk, execute the offline disk test according to section-2 module, Disk Deadstart Troubleshooting. If the CIP device is tape, execute the tape test according to the section-2 module, Tape Deadstart Troubleshooting.
INVALID CHANNEL NUMBER	The specified channel number does not have a disk or tape connected to it.	Check the CIP Location line on the Configure Critical Devices menu and enter the correct channel number.
MAINTENANCE CHANNEL TIMEOUT	Maintenance channel does not respond to the requested function.	Execute the board-level diagnostic on the TPM/MAC pak or execute the TPM/MAC self-test under the Diagnostics main menu. If diagnostics passes, retry the operation.
MICROCODE INITIALIZATION ERROR	Error is detected after a microcode initialization sequence.	Check for the correct level of microcode. If incorrect, install the correct level of microcode. See section-5 module, Installing or Updating CM3 Microcode, for the procedure.
NOT ENOUGH CHANNELS ON DEADSTART REQUIRED	CTI operation requires three channels: one each for the tape, the disk, and for communication.	Turn on at least three channels.
TAPE STATUS ERROR STATUS =XXXX	General status word XXXX returned from the tape indicates an error condition.	Retry the operation. If retry fails, refer to tables 2 and 9 of the section-2 module, Using the SAM Table.
TPM FUNCTION TIMEOUT	The two-port multiplexer (TPM) does not respond to a function from CTI.	Execute the TPM/MAC self-test under the Diagnostics Main menu or execute the board level diagnostic on the TPM/MAC pak.
UNABLE TO ACCESS CHANNEL FROM THIS CLUSTER	Wrong channel is assigned to the current cluster.	Select from channels 0 through 5 for cluster 0, and from 20 through 25 for cluster 2.
UNABLE TO ACCESS DISK (CR) TO PROCESS DIFFERENT DEVICE	Unable to access the specified device. Press <Return> to select a different device.	Execute the offline disk test under the Subsystem Tests of the Diagnostics menu. See module, Disk Deadstart Troubleshooting, for procedure.
UNABLE TO WRITE DISK READ ONLY SWITCH ACTIVE	The write protect switch on the disk drive is active.	Open the front door of the cabinet and press the write protect switch on the disk control panel. The write protect indicator should be off.

Using the Floppy Drive for Console Operation

If the console has a hard disk problem or failure that prevents the console from operating, you can use the procedure below to continue console operation using the floppy drive. To operate the console using the floppy drive, you must have the backup/recovery diskettes and the MS-DOS diskette.

1. With the console turned on, press <Ctrl Alt Ins>. The console displays a sign-on message as follows:

   MFM-140 Monitor, Version *X.X*
   Memory Size: 640K bytes
   Enter ? for help.
   ->

2. Insert MS-DOS Distribution Diskette 1, close the latch, then type **BF** and press <Return>. The console prompts for the date.

3. Enter the date in the format mm-dd-yy and press <Return>. The console prompts for the time.

4. Enter the time in the format hh:mm and press <Return>. The console displays an MS-DOS sign-on message plus the prompt A>.

5. Remove the MS-DOS Distribution Diskette.

6. Insert the Backup/Recovery Diskette 1.

7. Type **GO** to initialize console software from the floppy drive.

8. When the console initial display appears and prompts you to insert Backup/Recovery Diskette 2, remove Backup/Recovery Diskette 1 from drive A.

9. Insert Backup/Recovery Diskette 2 in drive A and press any key to bring up the Console Main menu.

Removing or Installing Isolation Privileges

The proprietary isolation software gives the users at the system console access privileges to the Analyze Last Error menu. Through this menu, you can isolate errors to specified pak(s) or chip(s). You must remove these isolation privileges from the customer who does not have a service contract or whose service contract has expired .

If you are servicing a system without the isolation privilege, you may install the isolation privileges before running the diagnostics. However, you must remove the isolation privileges before returning the system to the customer. Remove or install isolation privileges according to the following procedure:

Removing or Installing Isolation Privileges

1. Return to the console main menu.

2. Press <Alt F10> then **Y** to enable maintenance mode.

3. Press < Alt Q> then **Y** to confirm exit to DOS.

NOTE

The mainframe must be connected to the console and the mainframe power must be ON. The installation process reads the mainframe serial number to proceed.

4. Enter ISOLATE at the DOS prompt. An initialization screen appears and then prompts you to insert the proprietary isolation diskette.

5. Insert the proprietary isolation diskette in drive A and press <Return> to continue. After the diskette is verified, the following menu appears:

Isolation Installation
Install Isolation Privileges
Remove Isolation Privileges
Quit

6. Press **I** to install isolation privileges or press **R** to remove isolation privileges.

7. Press **Q** to exit and return to DOS.

8. Remove the proprietary isolation diskette from drive A.

9. Press <Ctrl Alt Del> to reboot the console.

Appendix A - Glossary of Terms and Acronyms

This glossary contains commonly used technical terms arranged alphabetically.

A Register

Address Register

Abort

To terminate a process, function, or procedure before completion.

Cache

A high-speed memory that resides in the central processor board.

CDCNET

Control Data Distributed Communications Network. A collection of compatible hardware and software products that interconnect computer resources to establish a communication network.

Channel Number

The number of the data channel on which a peripheral-device controller can be accessed.

CHS

CYBER Hardware Support.

CIP

CYBER Initialization Package. Software to initialize the CYBER mainframe and provide deadstart utilities.

CM, CM3

Control Module. A disk controller that controls fixed storage drives. CM3 is a disk controller using the intelligent peripheral interface.

CMEM

Central Memory. The main storage device in which the storage cells (words) can be addressed by a computer program and from which instructions and data can be loaded directly into registers. Instructions can be executed and data manipulated from these registers.

CML/VE

Concurrent Maintenance Library for the Virtual Environment.

CMSE

Common Maintenance Software Executive. The Control Data offline operating system on the mainframes of the CYBER 800 series.

CMTS

5698 CYBER Magnetic Tape Subsystem.

Controlware

A special kind of software that resides in a peripheral controller. The controlware defines the functional characteristics of the controller.

COS

Command Operating System. The operating system in the disk controller.

CPU

Central Processing Unit. The high-speed arithmetic unit that performs not only the addition, subtraction, multiplication, division, and incrementation functions but also the logic operation and branching needed to execute programs.

CTI

Common Test and Initialization. A software program that is executed from the Maintenance Software Library to initialize hardware and to interface with the user during the deadstart process.

DCB

Driver Control Block. Contains control parameters that the intelligent peripheral interface driver requires to perform a given task.

Deadstart

The process of initializing the system by loading controlware, components of the CYBER initialization package tape and the operating system. Coldstart and warmstart are two forms of deadstart.

Default

A fixed value supplied for a missing parameter in a command.

DFT

Dedicated Fault Tolerance.

DI

Device Interface. CDCNET hardware for open-system interconnections. The device interface houses processor boards in configurations that permit a network of other data processing equipment.

DMA

Direct Memory Access.

DOS

Disk Operating System. A user executes programs and performs disk operations using the disk-based operating system in the system console.

Dump

The process of transferring the contents of memory and registers to tape for analysis.

DVS

Diagnostic Virtual System.

ECC

Error Correction Code.

EEPROM

Electrically Erasable Programmable Read Only Memory.

Element Names

The system control language name assigned to each hardware element.

ESD

Electrostatic Discharge.

Ethernet

A baseband local area network protocol developed by the Xerox, Intel, and Digital Equipment corporations. CDCNET is an Ethernet-compatible network.

FCO

Field Change Order.

Format Diskette

The process of organizing the surface of a disk to accept programs and files of data.

FRU

Field Replaceable Unit.

FSD

Fixed Storage Drive.

GCR

Group Coded Recording.

HPA/VE

Hardware Performance Analyzer for the Virtual Environment. An online program that analyzes the NOS/VE error log to predict and isolate faults.

ICA

Integrated Communications Adapter.

ICCF

Interconsole Communications Facility.

ICI

Integrated Controller Interface.

IMS

Incident Management System. A procedure for responding to initial service calls from customers.

IOU

Input/Output Unit. A combination of all peripheral processors, channels, and related hardware.

IPC

Intelligent interface converter.

IPI

Intelligent Peripheral Interface. Defined on four levels. Levels 0 and 1 make up the physical interface. The pysical interface plus one of the two command sets define either an IPI-2 (level 2) or IPI-3 (level 3) interface.

IPI 2

Intelligent Peripheral Interface-Level 2. Level 2 refers to the device-specific commands that provide timing-critical operation. This is the interface between the disk controller and the disk drive.

IPI 3

Intelligent Peripheral Interface-Level 3. Level 3 refers to the intelligent commands that provide buffered operation and device management. This is the interface between the disk controller and the mainframe channel.

ISD

Intelligent Small Disk. The subsystem that consists of the disk driver, disk controller, and fixed storage drive.

ISMT

Intelligent Small Magnetic Tape. The subsystem that consists of the tapedriver, tape adapter, and streaming tape unit.

MAC

Maintenance Access Control. A microprocessor-based subsystem for accessing hardware maintenance registers and control registers.

MAF

Maintenance Activity Form. A form on which customer engineers describe their maintenance actions.

MAGIC

Memory Address Generation Integrated Circuit. A circuit that resides in the main logic board of the control module.

MALET/VE

Maintenance Application Language for Equipment Testing for the Virtual Environment.

MCM

Monitor and Control Module.

Microcode

Programs residing in control memory(s) that cause the hardware to execute the product set or diagnostic operations. Microcode is part of the CYBER Initialization Package.

Modem

A contraction of MODulator/DEModulator. A device that converts digital signals into analog signals and vice versa. Used for remote technical assistance given over standard voice-grade telephone lines.

MPU

Microprocessor Unit.

MSL

Maintenance Software Library. A repository of maintenance programs such as Common Maintenance Software Executive, Common Test and Initialization, and diagnostics.

MTC

Magnetic tape controller.

MTU

Magnetic tape unit.

NOS/VE

Network Operating System for the Virtual Environment.

OCMS

On-Chip Maintenance System. A facility that allows independent accessing and testing of VLSI-HD chips.

P Register

Program Address Register.

Pak

A Control Data term for logic board.

Page Map

A subsystem that is the interface between the central processing unit and central memory. Its main funtion is to translate system virtual address into real memory address.

PCU

Power Control Unit.

PE

Phase Encoded.

PP

Peripheral Processor.

PSR

Programming System Report.

PTM

Programmable Timer Module.

RAM

Random Access Memory.

Response Packet

A variable-length block of detailed drive or controller status that the controller sends to the disk driver through the intelligent peripheral interface.

ROM

Read Only Memory.

RTA

Remote Technical Assistance. Maintenance of Control Data equipment and software given by a remote support center over a telephone line or through a console.

SAM

Structured Analysis Method.

Segment Map

A subsystem in the central processing unit. Its main function is to translate process virtual address to system virtual address.

SRAM

Static Random Access Memory.

STU

Streaming Tape Unit.

SVS

System Validation Suite.

TAR

Technical Action Request.

TDI

Terminal Device Interface. A device interface that configures to support terminal-to-network transmissions.

TPM

Two-Port Multiplexer. A microprocessor-based communication path between the input/output unit and a local console. Also performs deadstart and IOU maintenance operations.

VLSI-HD

Very Large-Scale Integrated Circuit - High Density (6000-Gate Chip Array).

VSN

Volume serial number.

VX/VE

An operating system that is a layered implementation of the UNIX system running under NOS/VE.

Warmstart

A deadstart procedure used when the disk controller or tape is loaded and controlware is running.

XMD

Expanded Module Drive.

Appendix B - 5698 Magnetic Tape Subsystem

Like the 9639 Tape Subsystem, the 5698 CYBER Magnetic Tape Subsystem (CMTS) can be connected to a 930 or 932 mainframe. This appendix contains the following:

- Brief introduction to the CMTS;
- Troubleshooting approach on the CMTS;
- Procedure for executing the tape diagnostics from the system console;
- Error code interpretation of the tape diagnostics;
- Procedure for reloading or updating the controller microcode.

For more details about the 5698 CYBER Magnetic Tape Subsystem, refer to the following publications:

Control Data publication	Publication Number
5698-10, -11, -12 CYBER Magnetic Tape Subsystem (CMTS) User's Guide	60000397
311xC-OHI / 308xC-0HI CYBER Magnetic Tape Subsystem (CMTS) Hardware Operating Manual	60000407
311xC-OHI / 308xC-0HI CYBER Magnetic Tape Subsystem (CMTS) Theory of Operation	60000408
311xC-OHI / 308xC-0HI CYBER Magnetic Tape Subsystem (CMTS) Maintenance Manual	60000409
311xC-OHI / 308xC-0HI CYBER Magnetic Tape Subsystem (CMTS) Troubleshooting Manual	60000410
311xC-OHI / 308xC-0HI CYBER Magnetic Tape Subsystem (CMTS) Installation Manual	60000411
311xC-OHI / 308xC-0HI CYBER Magnetic Tape Subsystem (CMTS) Part Catalog	60000412

Introduction to the CYBER Magnetic Tape Subsystem

The 5698 CYBER Magnetic Tape Subsystem (CMTS) has a minimum of two cabinets. One cabinet contains a 698 Magnetic Tape Unit (MTU), a magnetic tape controller (MTC) along with an intelligent interface converter (IPC), and the power supplies of the MTU and MTC. The other cabinet contains an MTU, its power supply, and a power distribution box (PDB) as shown in the figure opposite. The PDB routes power to the power supplies of the MTCs in the two cabinets and to up to six additional MTUs mounted in separate cabinets bolted to the first two cabinets.

The tape subsystem uses the Integrated Peripheral Interface (IPI) to communicate with the 930 or 932 mainframe the same way as the 9836 or 9853 disk subsystem does.

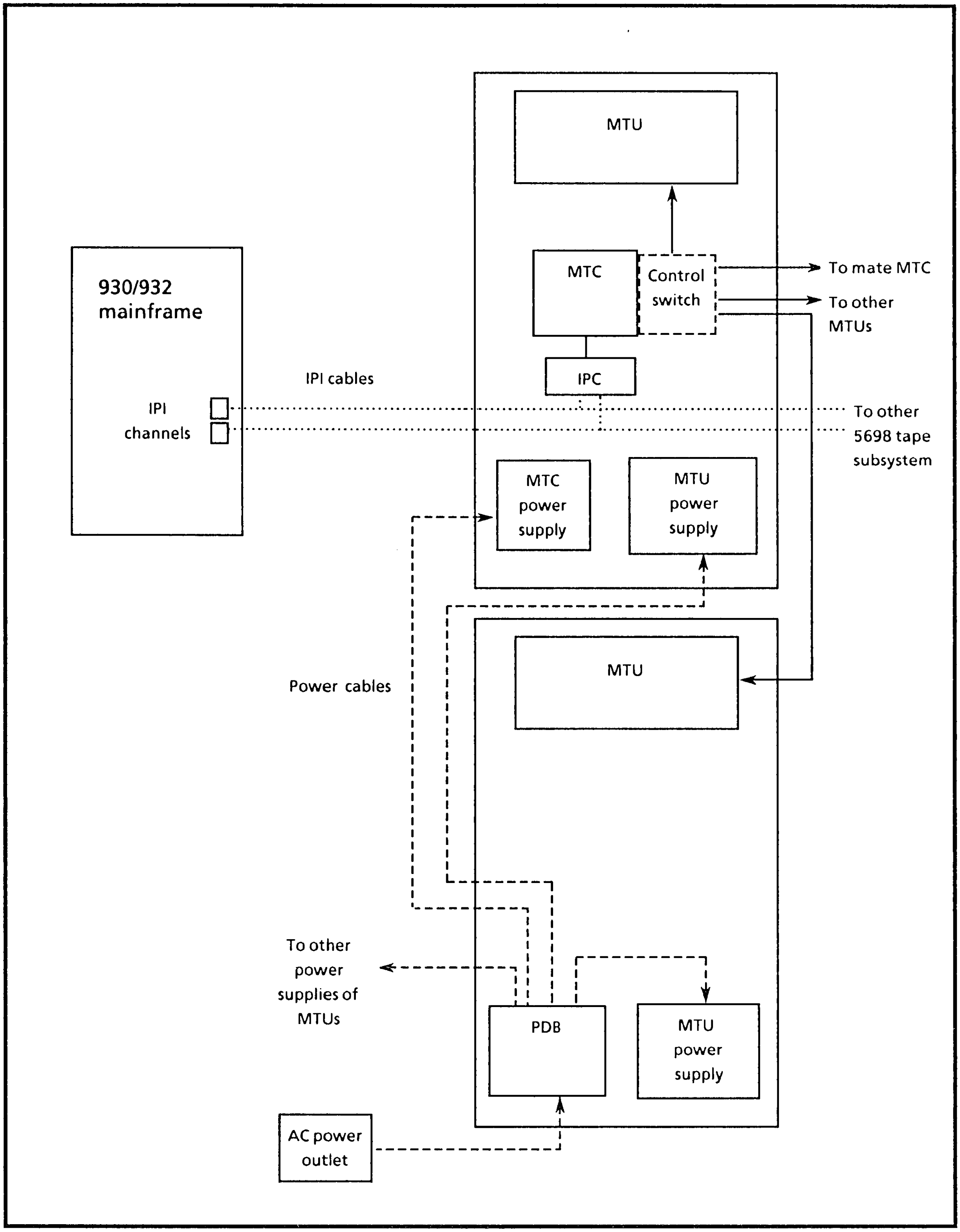
Similar to the 9836 or 9853 disk subsystem, the CMTS also permits dual access from two mainframe IPI channels to the tape controller. In a 2×8 tape subsystem, a control switch is installed in one of the MTCs so that either MTC can access the eight MTUs.

Unlike the 9639 Tape Subsystem, which requires loading microcode to the tape adapter every time the mainframe is powered on, the 5698 tape subsystem has no adapter in the mainframe. The tape controller microcode is permanently stored in the EEPROMs of the IPC.

Troubleshooting the CMTS

- Use the HPA/VE error incident report for detection of online problems in the MTC and MTU.
- Execute the MALET/VE test I9X for online fault isolation of the 5698 Tape Subsystem.
- Execute the CIP tape tests or scratch tape tests from the system console for offline isolation of the 5698 tape subsystem.
- Refer to the CYBER Magnetic Tape Subsystem (CMTS) Troubleshooting Manual [Control Data publication 60000410] for execution of inline diagnostics to isolate faults in the magnetic tape unit, tape controller, and the IPC.
- If you need to reload or update the tape controller micrcode, refer to the procedure, Reloading or Updating the Controller Microcode, in this appendix.

5698 Tape Subsystem



Executing the Tape Diagnostics

When deadstart from the 5698 tape subsystem fails during a tape operation such as an update, an installation of Maintenance Software Library (MSL), or a CYBER initialization package (CIP) operation, execute the offline tape diagnostics as follow:

1. Select Tape Test by entering this sequence from the Console Main menu:

M	to select Maintenance
E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
D	to select Diagnostics
S	to select Subsystem Tests
T	to select Tape Test

2. Press **E** to enter or check parameter words 0 through 2. The figure opposite shows what to enter in parameter words 0 through 2.

   If you select the CIP tape tests, the tests execute in the following sequence:

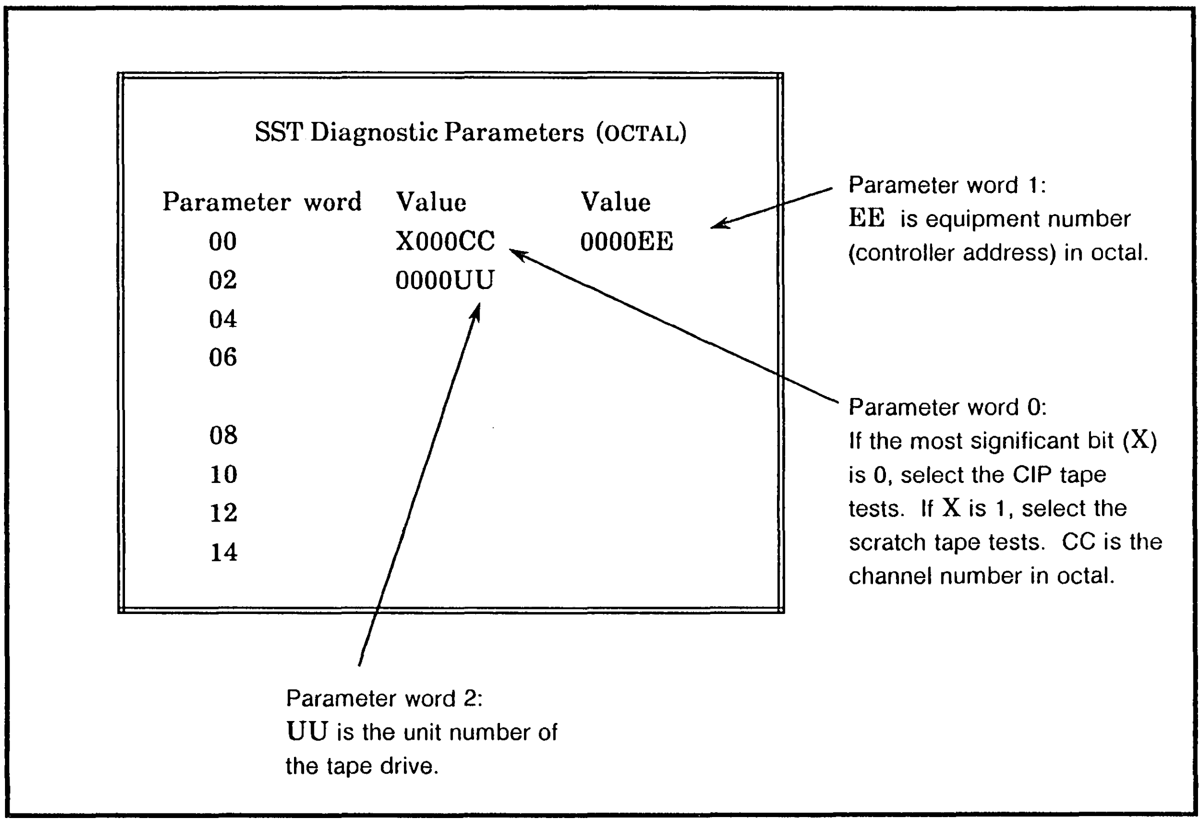
   - Initialize the magnetic tape subsystem;
   - Request the specified IPC to perform all the inline controller diagnostics;
   - Write a block of random data to the controller buffer, read them back, and compare.
   - Read a few words from the header record of the CIP tape and verify them with predefined CIP tape contents;

   If you select the scratch tape tests, the tests execute in the following sequence:

   - Initialize the magnetic tape subsystem;
   - Request the specified IPC to perform all the inline controller diagnostics;
   - Request the specified IPC to perform all the inline tape unit diagnostics;

- Write a block of random data to the controller buffer, read them back, and compare;
- Write a block of random data to the scratch tape, read them back, and compare.

Entering Tape Test Parameters



3. Press <F3> to save the content of the parameters.
4. Press **S** to select the deadstart peripheral processor.
5. If the channel number is in the range 01 through 05, enter **00**. If the channel number is in the range 21 through 25, enter **20**.
6. Press **R** to display the instructions to proceed with the test execution.
7. Mount a CIP tape or a scratch tape on the designated tape drive and ready the drive.

8. Press <Return> to start test execution.

   The test execution time is less than one minute. When an error occurs, the P and A registers display stops cycling.

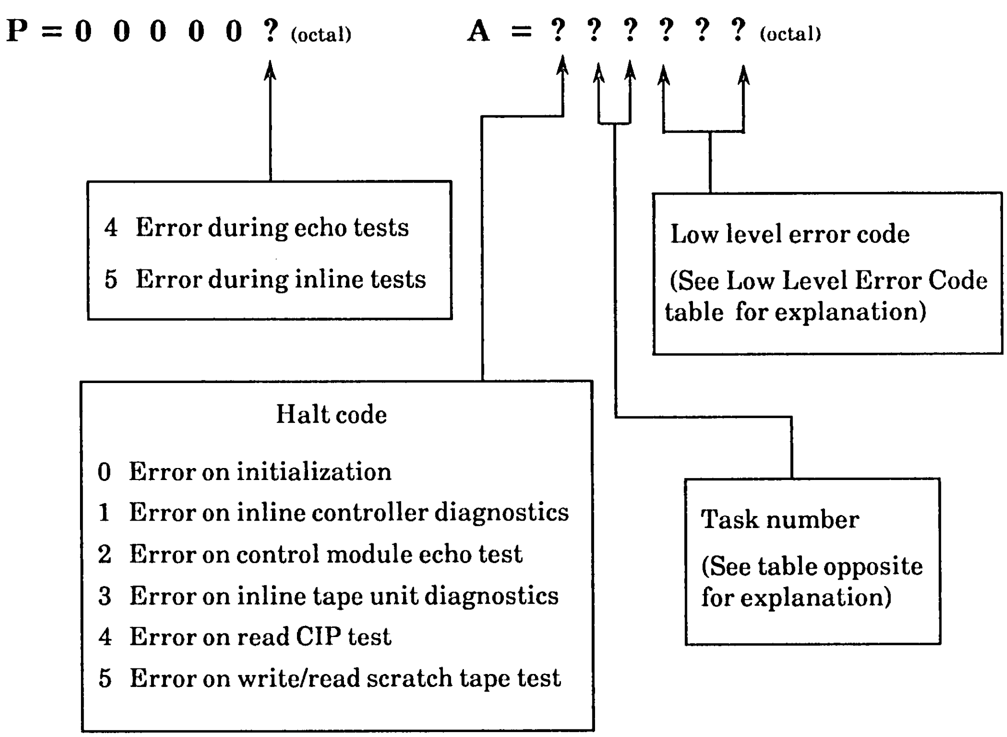
Interpreting Error Codes

If no errors occur, the test monitor returns to the Subsystem Tests menu. If the test detects an error, the displays of the P and A registers on the console stop cycling.

Record the contents of the P and A registers and see the following explanation for the contents of the P and A registers for further isolation.

Information about the interpretation of the content of the error code is also in the help display. To access the help display, press <Alt F1>.

Contents of the P and A Register



Task Number (octal)	Description
01	Reset controller
02	Select controller
03	Deselect controller
04	Reserve tape unit
05	Release tape unit
06	Set or report tape operation mode
07	Space file mark or record
10	Write file mark
11	Request tape subsystem status
12	Rewind tape
13	Unload tape
14	Erase tape
15	Read data from tape
16	Write data to tape
17	Load Initial Microprogram Load (IML) data to controller
20	Change controller attributes
21	Request model information
22	Request task complete
23	Perform IPC diagnostics
24	Perform tape unit diagnostics
25	Read controller buffer
26	Write controller buffer

Low-level Error Code (Table 1 of 2)

Low-level Error Code (octal)	Description
000	Compare data mismatch error
016	Channel active before function out
017	Channel active 1 μs after function out
021	No asynchronous response on selective reset
041	Slave-in rise time-out error
042	Unknown controller address received
043	Channel error after select status byte received
061	Sync-in rise time-out error
062	Wrong bus acknowledge byte received
063	Channel error flag after bus acknowledge byte
064	Sync-in fall time-out error
101	Word count residue after information transfer out
121	Slave-in rise time-out error
122	Channel error flag after ending slave status received
123	Information transfer unsuccessful
141	No slave interrupt byte present
142	Channel error after slave interrupt received
143	No controller interrupt within an allotted time
161	Word count residue after information transfer in
162	Word count residue after inputting response packet
163	Channel empty when input word expected
201	Slave-in fall time-out error
221	Slave-in rise time-out error
222	Channel error after transfer setting byte received
223	Slave-in fall time-out error

Low-level Error Code (Table 2 of 2)

Low-level Error Code (octal)	Description
241	Slave-in rise time-out error
242	Channel error after slave interrupt byte received
243	Slave-in fall time-out error
340	Operation unsuccessful
341	Task busy (no response packet received yet)
342	Data transfer or slave-in time-out error
343	Unexpected class 2 interrupt received
344	Unexpected class 1 interrupt received
345	Unknown response type received
346	Unexpected asynchronous response received
347	Command had conditional success
350	Critical error during ending status sequence
351	Unsuccessful data burst transfer
352	Drive not operational and ready
353	Controller not operational and ready
354	Unrecoverable data error
355	Unexpected interrupt - class 2 expected
356	Parameter ID not found in response packet
360	Invalid task specified
361	Invalid controller address specified
362	Invalid drive address specified
363	No data transfer length specified
364	Burst count not = 1 for R/W IPC buffer task

Reloading or Updating Controller Microcode

IPTL is an offline loader for loading microcode from central memory to the EEPROM in the intelligent interface converter (IPC) of the tape controller. Execute IPTL by using Common Maintenance Software Executive (CMSE) in the Common Test and Initialization (CTI) utility. Before executing IPTL, you must initiate CTI and load the microcode file from the disk drive to central memory.

To reload or update the controller microcode, refer to the following procedure:

1. Enter the following sequence from the Console Main menu to display the Configure Critical Device menu:

   M to select Maintenance
   U to select Utilities
   C to display the Configure Critical Devices menu

*** Configure Critical Devices ***

DEVICE	CH	EQ	UN	DEVICE TYPE
CIP LOCATION	01	00	00	**DISK**
INSTALL FROM	??	0?	0?	???? 1600
DUMP TO / RELOAD FROM	??	0?	0?	ISMT 1600

DIAGNOSTIC
DEADSTART PP = 00

Valid Entries:
For CH, EQ, UN and DEADSTART PP - Enter OCTAL Digit
For Device Types - Enter TL - Tape (ISMT 1600/IPI 1600)
TH - Tape (ISMT 6250/IPI 6250)
D - Disk

2. AT the CIP LOCATION line, enter the channel, equipment, and unit numbers for the disk drive that contains the Maintenance Software Library (MSL). Usually, the MSL is on the CIP disk.

3. Press <F3> and <Esc> to save the contents and return to the Maintenance menu.

4. Enter the following sequence to initiate a CTI deadstart from disk:

E	to select Engineering Tasks
T	to select Technical Support Functions
<Return>	to proceed
I	to select Initialize Hardware. This step is necessary if the system has just been powered on.
C	to initiate a CTI deadstart from disk and display the CTI Initial Options menu

```
            INITIAL OPTIONS

   A       OS LOAD AUTOMATIC
   U       UTILITIES
   M       OFF-LINE MAINTENANCE
   H       HELP


  (CR)     OS LOAD AUTOMATIC
```

5. Press **M** and <Return> to select Off-line Maintenance and to initiate CMSE with the default setting.

6. Enter the following CMSE commands to execute IPTL:

CC, MB301, 1000	to load microcode file to address 1000 (hexadecimal) in central memory
DP, X	to deadstart PP X. X is the PP number. Enter 4 or 24 for PP number.
LT, X, **IPTL**	to load and start IPTL from PP X
EP, X, **125,** CCMU	to enter CC (channel number), M (controller number), and U (unit number) in PP X at memory address 125. X and CC must be on the same input/output cluster. U is any number between 0 and 7.
<Space Bar>	to proceed

7. IPTL displays the current level of the microcode in the controller and gives instructions to proceed. Follow the instructions to complete the loading.

   After the loading starts, a series of data patterns is displayed on the 2-digit hexadecimal display in the controller panel. Do not interrupt the process until it finished.

   If the microcode is corrupted in central memory, loading fails and communication between the channel and the tape drive may be lost. Power the controller off and then on to reset the controller and to reestablish the communication link with the channel.

8. If you need to reload or update a second controller that is connected to the same channel, enter the following CMSE commands to continue. Make sure that you change the controller number (M) in the second command line.

   LT, X, IPTL

   EP, X, 125, CCMU

   If the second controller is connected to a different channel, press <Alt F2> to exit CTI. Repeat steps 1 through 7 to load microcode to the second controller.

Index

COMMENT SHEET

Manual Title: CYBER 930 Computer System
Maintenance Guide

Publication Number: 60469540
Revision: H

Name: ______________________________

Company: ______________________________

Address: ______________________________

____

____

This form is not an order blank.

Control Data welcomes your evaluation of this publication. You may indicate errors, suggest additions or deletions, and make general comments below. Please include page number references.

This comment sheet becomes a self-mailer when you cut the binding edge off and fold the sheet along the dashed lines on the reverse side.

fold fold

Place correct
postage here.

Attention: Publications

Control Data
1855 Minnesota Court
MISSISSAUGA, Ontario
CANADA
L5N 1K7

fold fold